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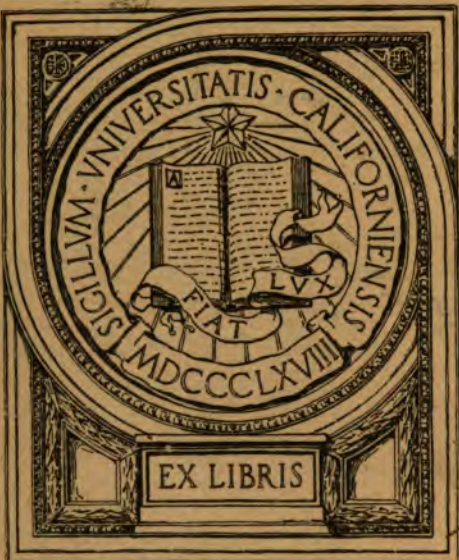
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... REPORT ON ...

MANEUVER DIVISION

CAMP ROOT, ❁ ❁ ❁
FORT RILEY, KANSAS

September - 1902 - October

... BY ...

J. H. DOCKWEILER,
Major and Engineer Officer,
First Brigade, N. G. C.



SACRAMENTO:

W. W. SHANNON : : : : : SUPERINTENDENT OF STATE PRINTING
1903

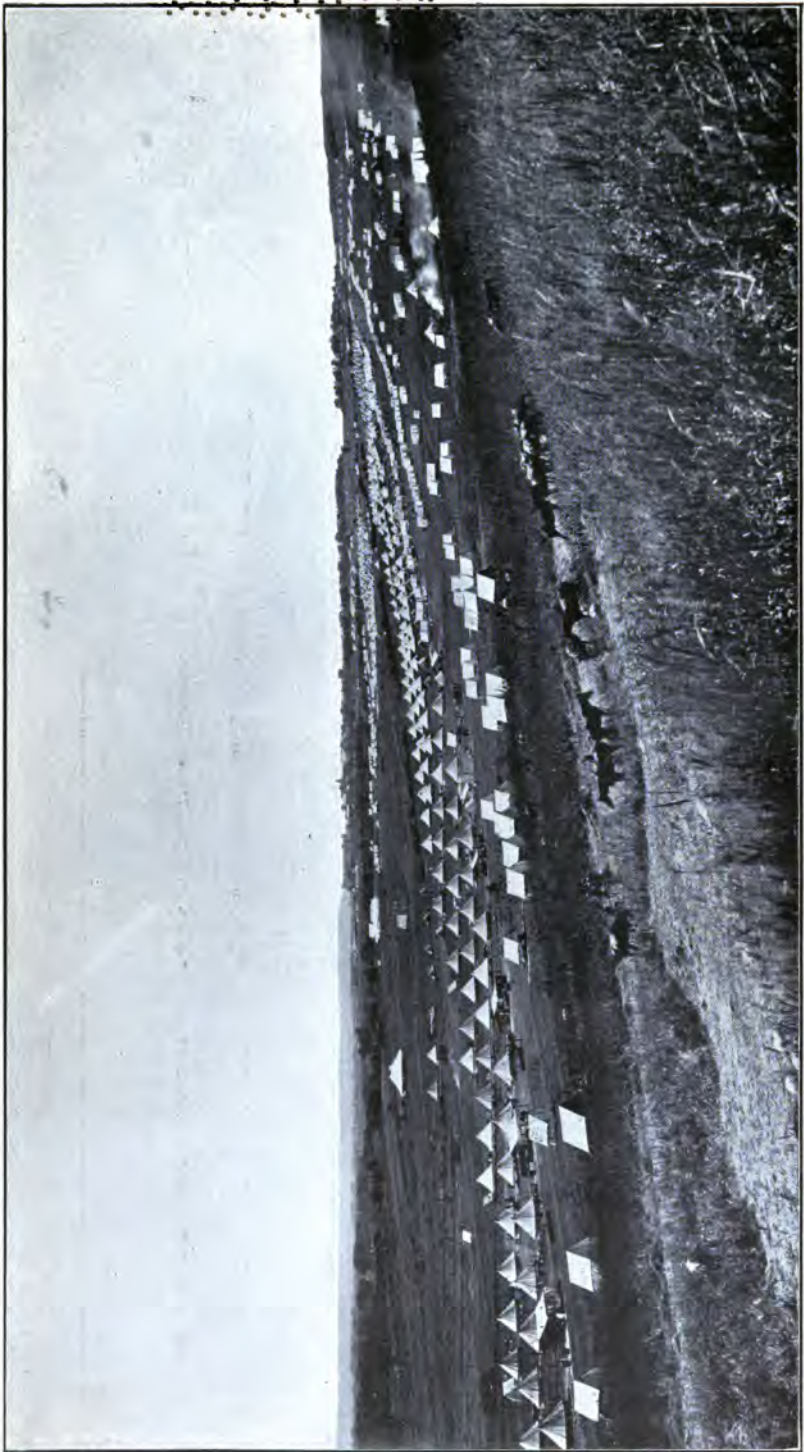


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GENERAL VIEW OF CAMP ROOT.
Looking Southeast from Sheridan Bluffs, toward Post at Fort Riley, Kansas.

UNIV. OF
CALIFORNIA



GENERAL VIEW OF CAMP ROOT.
Looking Southeast from Sheridan Bluffs, toward Post at Fort Riley, Kansas.

Calif. Adjutant Gen. 45

REPORT ON

MANEUVER DIVISION

CAMP ROOT, * * *
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REPORT

ON

Maneuver Division, Camp Root, Fort Riley, Kansas.

By J. H. DOCKWEILER,
Major and Engineer Officer, First Brigade, N. G. C.

LOS ANGELES, CAL., January 5, 1903.

BRIGADIER GENERAL GEORGE STONE,
Adjutant General, State of California.

SIR: Pursuant to the following instructions:

SPECIAL ORDERS,
No. 8. }

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
SACRAMENTO, September 22, 1902.

(Extract.)

The Secretary of War having requested that an officer of the National Guard of California be sent to Fort Riley, Kansas, to witness and take part in the joint maneuvers of troops of the Regular Army and National Guard, commencing September 29, 1902, Major J. H. Dockweiler, Engineer Officer, First Brigade Staff, is hereby detailed for such service and will proceed at once to Fort Riley, and upon arrival there, will report to Major General John C. Bates, U. S. A. Upon the completion of this duty, Major Dockweiler will return to his home, and report in writing to the Adjutant General the result of his observations upon the military exercises which he is to witness.

The expense connected with this duty will be paid from the proper military fund.

By order of the Commander-in-Chief.

GEORGE STONE,
Adjutant General.

Official: (Signed:) N. S. BANGHAM,
Assistant Adjutant General.

I have the honor to submit the ensuing report.

I arrived at Headquarters Maneuver Division, Fort Riley, Kansas, on the morning of September 29, 1902, and immediately reported to Major General John C. Bates. I was assigned to a tent among those set apart for visiting National Guard officers. An information bureau attached to Headquarters, with a bulletin board in front of the tent designating it as such, in charge of three enlisted men, enabled me to secure such information as I required upon my arrival. This tent was placed next to the Chief Quartermaster's office, and was the first encountered in approaching Headquarters.

I was furnished with maps of Fort Riley Reservation, with circular No. 2, containing "Instructions for Framing Detachment Orders," and a "Schedule of Exercises for Maneuver Division."

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The troops participating in the maneuvers were assembled by the following order:

GENERAL ORDERS,
No. 96.

HEADQUARTERS OF THE ARMY, ADJUTANT GENERAL'S OFFICE,
WASHINGTON, August 20, 1902.

With the approval of the Acting Secretary of War, the following organizations will be assembled in camp at Fort Riley, Kansas, about September 20, 1902, to participate in the maneuvers to be held at that point during a period of ten days, beginning Monday, September 29th, and continuing until Wednesday, October 8, 1902:

First Battalion of Engineers;
Headquarters, band, first and second squadrons, Fourth Cavalry;
Third squadron, Eighth Cavalry;
Sixth, Seventh, Nineteenth, Twentieth, and Twenty-eighth Batteries Field Artillery;
Headquarters, band, and twelve companies Sixth United States Infantry;
Headquarters, band, and twelve companies Twenty-second United States Infantry;
Headquarters, band, and Eighteenth United States Infantry, excepting Company L;
Detachment Signal Corps;
Detachment Hospital Corps.

Posts which will be left without garrisons will each be cared for by a guard consisting of one commissioned officer and the smallest number of men consistent with the proper performance of the duty. It is desirable that organizations participating in the maneuvers shall have the maximum number of men available present for duty.

All organizations of the Regular Army participating in these maneuvers will be provided with the regulation allowance of wall tents for officers and conical wall tents for enlisted men at the rate of —

For cavalry, ten men per tent;
For field artillery, twelve men per tent;
For infantry, twelve men per tent.

The Governors of Arkansas, Kansas, and Nebraska, having signified their acceptance of the invitation of the Secretary of War to participate in these maneuvers, arrangements will be made for the following troops: Arkansas, one battalion of infantry; Kansas, two regiments of infantry, two batteries of field artillery; Nebraska, two regiments of infantry, twelve companies each.

The regular and militia forces will be organized as a division. Major General John C. Bates, U. S. Army, is assigned to command, and will proceed to Fort Riley, Kansas, not later than September 20, 1902, accompanied by his aids.

The following officers are assigned to duty, during the encampment, on the staff of Major General Bates, and will report to him by letter without delay and in person at Fort Riley, Kansas, not later than September 20, 1902:

Major J. W. McClernand, U. S. Cavalry, Assistant Adjutant General, adjutant general;
Lieutenant Colonel S. C. Mills, inspector general;
Captain C. B. Baker, Quartermaster, chief quartermaster;
Captain H. J. Gallagher, Commissary, chief commissary;
Lieutenant Colonel John Van R. Hoff, Deputy Surgeon General, chief surgeon;
Major G. P. Scriven, Signal Corps, chief signal officer.

After the completion of the maneuvers, Major General Bates and the other officers named will return to their proper stations.

The travel enjoined is necessary for the public service.

By command of Lieutenant General Miles.

WM. H. CARTER,
Brigadier General U. S. Army,
Acting Adjutant General.

Arkansas did not furnish its battalion of infantry, but a battalion of infantry was provided by Colorado, thus making an aggregate of about five thousand officers and men.

CAMP SITE.

The camp site, called Camp Root, was situated on Fort Riley Military Reservation, and was located on Pawnee Flats, on the west side of the Kansas River, and practically extended from the post hospital at Fort Riley to Sheridan Bluffs, a distance of one and one half miles. The plan of the camp was as follows:

Headquarters faced northeasterly and was located on the sloping flat on the right bank of One-Mile Creek and on the west side of the wagon road leading from the Post at Fort Riley northeasterly to Ogden.

Southeasterly from Headquarters and across the wagon road upon the flat were camped the First Battalion of Engineers, near One-Mile Creek; to the east of them the Signal Corps detachment; south of the Signal Corps was the general corral; and next to the Post were the Twenty-eighth Artillery and Kansas National Guard batteries.

Near the left bank of One-Mile Creek and west of the road were the field hospital and ambulance company, which latter was next to the wagon road. Going northerly along the street dividing the regiments, the Sixth Infantry was on the west and the Twenty-second on the east; then the Eighteenth Infantry on the west and the Colorado Battalion of National Guard on the east; then the Second Kansas, and then the First Kansas National Guard, both on the west; then the Fourth Cavalry squadron and Eighth Cavalry squadron, both on the west.

The camp site had a gentle slope, and permitted of excellent drainage.

FORT RILEY MILITARY RESERVATION.

Fort Riley, Kansas, Military Reservation comprises over twenty thousand acres of land, measuring eight miles east and west at its greatest length, and six miles north and south at its greatest width, having the form of a half circle with a diameter of eight miles. Drawing said diameter from Junction City, Kansas, northeasterly through the Post at Fort Riley (distant three miles from Junction City) to Ogden, Kansas, ninety per cent of the area would lie north of said line.

Roughly described, it is bounded on the south by the Republican and Smoky Hill rivers (which join and form the Kansas River one mile west of the Post) and the Kansas River.

The reservation can be divided into two parts, as to terrain: One, the rolling hills, from one hundred and fifty to two hundred feet above the rivers and forming a salient angle to the southeast, at the apex of which are located the buildings of the Post. These hills are cut up by numerous ravines, the bottoms of which are all thickly wooded as they approach the rivers. The hills are covered with a heavy growth of buffalo grass. A great number of flat limestone ledges are exposed on the tops and sides of the hills.

The other, the flats or lowlying lands, situated between the rivers and the hills.

One of these flats is three miles long, varying from one third of a mile to two miles wide, located north of Junction City, and being in the southwest corner of the reservation south of Ogden.

A range of hills about one hundred and fifty feet high, general north-east and southwest strike, lies about two miles east of the Post. The intervening space between the Kansas River and these hills is a flat about ten feet higher than the river, and is open country save for a clump of trees covering about one hundred and sixty acres, a mile northeast of the Post. To the south of the Post the flats are thickly covered with trees. The remaining flats are open country.

The margins of the rivers are very heavily wooded; I noted hickory, black walnut, red elm, and cottonwood trees.

Viewed from the rivers the hills present themselves in the shape of gentle bluffs about one hundred feet high.

At a point south of the Post, the Kansas River flows along the base of the hills, and taking this point as a center, the hills lie fan-shaped to the north, having an interior angle of about one hundred and twenty degrees.

An electric street railway runs from Junction City to the Post.

The Union Pacific Railway runs through the reservation, along the left bank of the Kansas River. A branch of said road, known as the Fort Kearney, leaves it at Junction City and runs along the right bank of the Republican River. A depot is located at the Post and sidings at the Pawnee Flats.

Good wagon roads lead from Junction City to the reservation. Three main roads cross the reservation in a general north and south direction. Side roads lead from them. Two wagon road bridges cross the Republican River.

The roads outside of the immediate vicinity of the Post are the ordinary dirt road, passable for all arms of the service, with no steep grades. In wet weather the roads on the hills are sticky and extremely slippery, forming the "gumbo" mud. In the flats, the soil being somewhat sandy, the rains improve the roads.

A map of the Fort Riley Military Reservation, showing the location of Camp Root, is hereto attached.

MANEUVERS.

The schedule of maneuver exercises was arranged by the following officers, detailed for that purpose in Special Orders No. 163, issued from Headquarters Department of the Missouri, August 29, 1902:

Colonel Camillo C. Carr, Fourth Cavalry;

Colonel George B. Rodney, Artillery Corps;

Colonel Arthur L. Wagner, Assistant Adjutant General, U. S. A.;

Major E. J. McClernand, Assistant Adjutant General, U. S. Cavalry;

Captain Horace M. Reeve, Seventeenth Infantry.

The following is a copy:

SCHEDULE OF EXERCISES MANEUVER DIVISION—FORT RILEY, KANSAS.
September 20th—October 8th, 1902.

	REGULAR TROOPS.	NATIONAL GUARD.
Sept. 20, Sat...	Arriving and making camp.	
21, Sun...		
22, Mon...	{ Forenoon: Regimental Drill, close order. Afternoon: Regimental Drill, extended order.	
23, Tues...	{ Forenoon: Brigade Drill, close order. Afternoon: Division Drill, close order.	
24, Wed...	Formation of an outpost for an army corps, with exercises in attack and defense of same.	
25, Thurs.	Exercise of each regiment in the formation and conduct of advance guards and rear guards.	
26, Fri....	Exercise of each regiment as advance guard of an imaginary division, involving the employment of artillery.	
27, Sat...	The entire force on the march, with suitable advance guard for a division of full war strength, advance guard entire, main body in part imaginary.	
28, Sun...		
29, Mon...	Problem of contact of opposing forces of all arms.	} Arriving and making camp.
30, Tues..	Attack and defense of a convoy.	
Oct. 1, Wed..	{ Forenoon: Brigade Drill, extended order. Afternoon: Division Drill—(entire command).	Regimental and Brigade Drill, close order.
2, Thurs.	{ Forenoon: Outpost exercise, involving attack on outpost position (four separate exercises). Afternoon: Lecture to field officers and captains by Col. Arthur L. Wagner, Ass't Adj't General, U. S. A.	Lecture on Intrenchments to officers by an officer of the Corps of Engineers, U. S. Army.
3, Fri....	Forenoon: Advance and rear guard with simulation of attack (four separate exercises).	Construction of a modern field bridge — 8:00-10:00 A. M.
4, Sat....	Forenoon: Advance guard—(entire command).	Construction of pontoon bridge by engineers — 8:00-10:00 A. M.
5, Sun...		
6, Mon...	Attack and defense of a position—(entire command).	
7, Tues..	Review of the command, or a tactical exercise—(entire command).	
8, Wed..	Contact of two opposing forces—(entire command).	

The above programme is liable to change as necessity may require.

HEADQUARTERS MANEUVER DIVISION,
CAMP ROOT, FORT RILEY RESERVATION, September 20, 1902.

Official:

V. L. WELLS, 1st Lieut., 12th Infantry, Aid-de-Camp.

Owing to the heavy rainfall the entire schedule of exercises could not be completed.

The following exercises, as per printed schedule, were carried out, beginning with September 29th, the date of my arrival, but not always upon the allotted dates:

Sept. 29—Problem of contact of opposing forces of all arms.

Sept. 30—Attack and defense of a convoy.

Oct. 2—Forenoon: Outpost exercise, involving attack on outpost position (four separate exercises).

Afternoon: Lecture to field officers and captains by Colonel Arthur L. Wagner, Assistant Adjutant General, U. S. A.

Lecture on intrenchments, to officers, by an officer of the Corps of Engineers, U. S. Army.

Oct. 3—Construction of a modern field bridge.

Oct. 4—Construction of pontoon bridge by engineers.

Oct. 6—Attack and defense of a position (entire command).

Oct. 8—Contact of two opposing forces (entire command).

Circular No. 2, for framing detachment orders, follows:

HEADQUARTERS MANEUVER DIVISION,
CAMP ROOT, FORT RILEY RESERVATION, KANSAS,

September 20, 1902.

CIRCULAR }
No. 2. }

The following instructions compiled mainly from those formerly prepared at the Cavalry and Light Artillery School, Fort Riley, Kansas, are published for the information and guidance of this command.

By command of MAJOR GENERAL BATES:

E. J. McCLERNAND,

Major of Cavalry,

Adjutant General.

Official:

1st Lieut., 12th Infantry,
Aid-de-Camp.

INSTRUCTIONS FOR FRAMING DETACHMENT ORDERS.

1. Study the terrain upon the best map attainable. The situation of the detachment and that of the enemy.

2. In all questions involving maneuvers or marches calculate the time required to place the detachment in order of march as well as the time required to reach a given objective.

If the occupation of a position is contemplated, the extent of front and depth should be measured.

3. Consider the probable movements of the enemy during the time required to reach the objective.

4. Determine the course of action—avoid the adoption of half measures. If the offensive is decided upon, attack vigorously with the entire force. If the detachment is to retreat, gain a safe distance from the enemy before halting, unless good reasons exist to act otherwise. Carefully decide upon the plan of action and carry it out with decision.

5. Study the best distribution of the troops. Draw up a rough draft of the duty and position for each fraction, to see that nothing is forgotten.

6. In drawing up the order follow accepted models until experience will suffice. Leave beaten paths only when there is good reasons for doing so. The order should read in a logical manner. Number each paragraph and observe that a paragraph should include kindred subjects. Revise the draft of the order, leaving out all superfluous words, substituting briefer expressions wherever possible. Do not give reasons for orders. The order should be absolutely clear. Be sufficiently explicit to avoid misinterpretations. Avoid the use of all indefinite expressions, such as "to the right," "to the left," "in front of," "in rear of," "beyond or below." Use rather the points of the

compass. Instead of saying "to the left of Fort Riley" say "west of Fort Riley." If there is occasion to say "by the outlet south of the village of X," this should be the only outlet of the village to the south—there should be no other. Where there are several outlets, say "by way of the road to Y."

7. The order should be explicit, otherwise it will not be executed with energy. Avoid all weak expressions such as "as much as possible," "if possible or practicable," "according to circumstances." An order once given, its author must assume all responsibility. The more difficult the situation the clearer and more precise should the directions be. Instructions promulgated in an order should not encroach on the functions of subordinates. The order should contain such instructions as may be necessary for the execution of the plan of action—the details being left to subordinate commanders.

The frequent modification of an order tends to fatigue troops, rob them of confidence in their commander, and breeds much indecision in subordinates. Indicate the hour and place with such exactness that no misunderstanding is possible. Where reference is made to time between noon and midnight use the expression "P. M." From midnight to noon say "A. M.," as "1:15 A. M."

8. The order should be drawn up on a sheet of paper ruled to include one half or one third as a margin. The left side should contain the distribution of troops and order of march, and the right side the order divided into paragraphs.

The designation of the order depends on the character of the duty, as "Detachment Orders," "Advance Guard Orders," "Advance Cavalry Orders," "Outpost Orders," etc.

THE PARAGRAPHS INTO WHICH THE ORDER IS DIVIDED CONTAIN:

I. Any information in regard to the enemy which it is considered advisable to publish, expressed in terms which are brief and plain and giving a clear idea of the situation.

It is only necessary to furnish as much as may be required to accomplish the task or to work for the common objective. Good news will naturally be given much prominence, but news which might unfavorably impress the troops will be either passed over in silence or lessened as much as possible.

II. So much of the general plan as should be communicated to subordinates, as "the detachment will march to-morrow on Manhattan."

It is often not expedient to state the object of the mission, but enough should be communicated to enable subordinates, in case of unforeseen events, to take on their own initiative such measures as will be consistent with the general situation. The Commanding Officer would naturally take more into his confidence his next junior, and especially the officer commanding the cavalry, who would then be able to distinguish from the reports sent to him the information which will be important for the detachment commander to receive.

III. Dispositions to carry out the plan as announced in the second paragraph.

If the cavalry is to act independently, instructions should be given for the conduct of the "advance cavalry" and at what hour it should leave. Then the hour of departure for the "advance guard" and what road should be taken. If the cavalry is attached to the advance guard it will receive its orders from the advance guard commander. Instructions for the march of the "main body" and at what distance it should follow the "advance guard." It may be necessary to state exactly the hour of departure for both the "advance guard" and "main body," if the troops composing each should be separated. Instructions for the "rear guard," if necessary to detail it, and the distance at which it will follow the main body, on commencing the march.

The instructions necessary to impart to the various divisions of the troops, as indicated above, should generally be placed under one paragraph (III) with subdivisions, as a. b. c. The principal subjects should be underscored.

In orders for an attack, the most important dispositions should be given first, then instructions for the reserve with the position assigned to it.

The orders for outposts should indicate the line of observation and routes and roads to be observed; the instructions for reserves—in case of attack the line to be held. This may be made the subject of a separate paragraph.

IV. A separate paragraph directs the disposition of the train. An officer and a small detachment of cavalry should be assigned in charge.

V. The last paragraph should announce where the Commanding Officer is to be found.

DISTRIBUTION OF TROOPS.

The margin on the left should show the parts of the command and subdivisions selected for protection, information, etc., and those composing the reserve or main body. In naming units from which a portion is taken, the unit should be named and the word "less" appended (1st Squadron 2d Cavalry, less one troop).

Usually a few cavalymen are assigned to march at the head of the main body for use as orderlies, when infantry constitutes the main force, and a small detail with the advance guard under similar circumstances. If there is but one battery of artillery it would naturally remain with the main body, following the first battalion, or with a portion of the troops in its front to insure its safety. An Engineer Company would march with the advance guard. A section of the Hospital Corps in rear of the main body.

Opposite the signature on the left half of the page indicate in what manner the order is made known to the troops, as "copy furnished regimental, squadron and battery commanders," or "dictated to troop commanders."

Following are models and examples of orders :

MODEL.

ORDER FOR A MOVEMENT TO THE FRONT.

Detachment Order :

Place—Date—Hour.

Distribution of Troops :

1. *Advance Guard.*

Name of officer commanding.
Composition of:
Infantry.
Cavalry.
Artillery.
Engineers.
Detachment Hospital Corps
*(when required).

2. *Main Body.*

Order of March.
Cavalry (detail to perform mounted orderly duty).
Infantry.
Artillery.
Infantry.
Engineers.
Detachment Hospital Corps
*(Ambulance).

3. *Flank Guard* (right or left).

Name of officer to command.

How transmitted—verbally, in writing, or by dictation. If in writing the order is signed by the Adjutant by order of the Commanding Officer, or by command of, if given by a general officer.

I. *What is known of the enemy*—information concerning the positions of friendly troops.

II. *Object of movement of detachment*—stated in general terms.

III. A *Instructions for the advance guard* (hour and place of departure—extent of service of security and information—special mission).

B *Instructions for main body* (distance from advance guard, or hour and initial point of departure).

C *Instructions for flank guards* (if required—same as to advance guard—attention particularly called to the service of information. When necessary indicate at what point or when the flank is to detach itself).

D *Instructions for the outpost* (if there be one thrown out); indicate when it will be drawn in and where it will join the column the next day.

IV. *Instructions for the train* (size of escort—distance in rear of the column—other special instructions).

V. *Place of Commanding Officer in the column* (or where reports will be received).

By order of _____

1st Lieut., 1st Cavalry,
Adjutant.

N. B.—If, instead of being attached to the advance guard, the cavalry is used independently as Advanced Cavalry, so mention in Par. 1 of the distribution of troops as Advance Cavalry, etc. Par. III A of the body of the order will then read :

III. A *Instructions for the advance cavalry* (hour and place of departure, direction of march, service of security and information, special mission, if any).

In this case a sufficient force of cavalry should be attached to the advance guard to assist in securing its immediate safety. Should there be no outpost included in the conditions of the problem, the paragraph referring thereto will be omitted.

* When accompanying the column, a detachment of the signal corps, ambulances, tool wagons, ammunition wagons, etc., will be included.

EXAMPLE.

ORDER FOR A MOVEMENT TO THE FRONT.

Detachment Orders No. 1.

Fort Riley, Kans., May 29, '97—8 P. M.

Distribution of Troops:

1. *Advance Cavalry.* Maj. R.
1st Squadron 2d Cavalry (less
1 platoon).
2. *Advance Guard.* Maj. C.
1 platoon 1st Squadron 2d Cav-
alry.
4 companies 1st Infantry.
1 company Engineers.
3. *Main Body. Order of March.*
1 N. C. O. and 6 men 1st Squad-
ron 2d Cavalry.
4 companies 1st Infantry.
Light Battery F, 4th Artillery.
2d Infantry.
Ambulance and Hospital Corps.

I. *The enemy's infantry and artillery camped at Garrison; his cavalry patrols were seen at Keats.*

II. *The detachment will march to-morrow on Stockdale.*

III. A *The advance cavalry will move to-morrow at 6 A. M. and proceed to Stockdale. It will reconnoiter towards Manhattan, and will observe the roads from Riley Center.*

B *The advance guard will leave at 6:30 A. M. It will take the road Fort Riley, Ogden, Keats P. O. and Stockdale.*

C *The main body will follow the advance guard at 1,000 yards.*

IV. *The train, under charge of an officer and 8 men of the 1st Squadron, will proceed by Fort Riley, Ratliff Ranch and Keats road, to Keats, and there await orders.*

V. *The Commanding Officer will be at the head of the main body.*

Dictated to officers in charge.

A.,
Colonel Commanding.

MODEL.

ADVANCE GUARD ORDER.

Advance Guard Order:

Place—Date—Hour.

Distribution of Troops.

1. *Advance Cavalry.*
Commanding Officer.
Cavalry.
2. *Van Guard.*
Commanding Officer.
Infantry.
Cavalry.
Engineers.
3. *Reserve (order of march).*
Cavalry.
Infantry.
Artillery.
Infantry.
Section of Hospital Corps
(rarely attached to advance guard
of a small detachment).

I. *What is known of the enemy—information concerning friendly troops.*

II. *Duties of the advance guard.*

III. A *Instructions for advance cavalry (hour and place of departure, route, service of information, special mission or duty).*

B *Instructions for the van guard (as in Par. III).*

C *Instructions for the reserve (distance from van guard or else place and hour of departure).*

IV. *Instructions for outposts (if necessary).*

V. *Instructions for regimental trains (exceptional cases).*

VI. *Where Commanding Officer will march.*

Manner in which order is commu-
nicated.

Signature of Commanding Officer
or Adjutant.

N. B.—If cavalry is used as a portion of the van guard and not detached in advance, the order would be framed to omit instructions for advance cavalry, and the distribution of troops would show the cavalry under the head of "the van guard."

EXAMPLE.

ADVANCE GUARD ORDER.

Advance Guard Orders No. 1:

Distribution of Troops.

1. *Advance Guard Cavalry.*

Maj. B.

 1st Squadron (less 1 platoon)
1st Cavalry.
2. *Van Guard.* Capt. W.
 1 platoon 1st Squadron 1st Cavalry.
1st Battalion 2d Infantry.
1 company Engineers.
3. *Reserve* (order of march).
 1 N. C. O. and 6 men 1st Squadron 1st Cavalry.
2d Battalion 2d Infantry.
Light Battery F, 5th Artillery.
3d Battalion 2d Infantry.
3d Infantry.
½ company Hospital Corps,
with ambulances.

Fort Riley, Kans., May 31, '97—7 P. M.

I. *A Division of the enemy is reported at Topeka; a detachment is at St. Marys, and cavalry has appeared at Manhattan.*

II. *The advance guard will march to-morrow to Manhattan.*

III. A *The advance guard cavalry will proceed at 5:30 A. M. via Ogden-Eureka Lake. It will reconnoiter towards Keats and Stockdale and cross the Big Blue at Manhattan, sending patrols on the roads beyond.*

B *The van guard will leave at 6 A. M. and follow the same route.*

C *The reserve will follow at a distance of 1,500 yards.*

IV. *The Commanding Officer will be with the van guard.*

Communicated verbally to commanding officers of subdivisions and cavalry officers.

A.,
Colonel Commanding.

MODEL.

ORDER FOR A RETREAT.

Detachment Orders No. —

Place—Date—Hour.

Distribution of Troops:

I. *What is known of the enemy and our own troops.*1. *Advance Guard.*
 Commander.
Infantry.
Engineers.

II. *Mission of the detachment* (intention of its commanding officer).

2. *Main Body* (and order of march).
 Ambulance.
Engineers.
Infantry.
Artillery.
Cavalry.

III. A *Instructions for advance guard* (place and hour of departure, route, special duties; as for example, preparing for destructions on the route).

B *Instructions for rear guard* (distance, place and hour of departure; exploration principally on lateral roads; it is frequently said "preserve contact with the enemy by means of patrols"; special missions).

C *Instructions for flank guards* (as in Par. III B).

3. *Rear Guard.*
 Commander.
Infantry.
Cavalry (much as possible).
Artillery (always if it be possible).

IV. *Instructions for regimental train*, if necessary (generally sent at a distance; place and hour of departure, route, escort).

V. *Instruction for outposts*, if necessary; when withdrawn.

4. *Right or Left Flank Guard.*
Commander (as for rear guard).

VI. *Place of Commanding Officer at beginning of movement.*

Manner of communicating order to troops.

Signature.

N. B.—Cavalry is, as a rule, not employed independently in a retreat.

MODEL.

ORDER FOR OUTPOSTS FROM AN ADVANCE GUARD.

Advance Guard Order No. —.

Place—Date—Hour.

No distribution of troops.

I. *What is known of the enemy and of our own troops* (position of the main body of the column and main body of the advance guard).

II. *Detailing commanding officer of outposts and troops for same.*

III. *Special instructions* (line to be occupied approximately indicated).

(It is extremely rare that the outposts of detachments include several sections.) What is to be done in case enemy attacks. What inhabited places are to be particularly held. Point which will require special watching.

IV. *Instructions for those of the advance guard not detailed for outpost duty.* Indicate measures to be taken by main body of advance guard in case of attack.

V. *In certain cases, particular instructions for regimental train* (to rejoin at the outpost or not).

VI. *Place of advance guard commander.*

Manner of communicating order.

Signature.

MODEL.

ORDER FOR AN OUTPOST OF ALL ARMS.

Outpost Orders No. 1.

Place—Date—Hour.

I. *What is known of the enemy and of our own troops* (position of the main body of the detachment and that of the main body of the advance guard; position of neighboring outposts, if there are any).

II. *What troops are to be employed and general indication of the line to be occupied.*

III. A *Instructions for the cavalry of the outposts* (seeking contact with the enemy; general line of security, routes which must be particularly watched, places to be reconnoitered or communicated with; orderlies or small fractions of cavalry to be attached to infantry).

B *Instructions for companies or supports* (commencing with the right boundaries of sections of outposts, approximate positions).

C *Instructions for the reserve* (composition, position, measures for immediate security to be taken, if there is occasion).

IV. *What is to be done in case of attack* (line of resistance to be held).

V. *Place of outpost commander* (generally with the reserve).

Manner of communicating order.

Signature.

Outpost Orders No. 2.

Place—Date—Hour.

I. *What is known of the enemy* (if further information than that contained in first order is known).

II. A *Outpost cavalry* (latitude allowed it to be prepared in case of emergency; hour at which it will be drawn in at night and position it will occupy; duty during the night; hour at which day position will be resumed next day; patrolling resumed at daybreak).

B *Supports* (latitude allowed in case of emergency; hour at which night positions will be occupied; routes of patrols for the night, if there be any; communication to be established with neighboring troops; re-occupation of day positions next day).

C *Reserve* (latitude allowed; measures to be taken for night, if necessary; hour at which it will be under arms next day).

III. *Roads upon which examining posts will be located.*

IV. *Defensive roads (if any), barricades on roads, etc.*

Manner of communicating order.

Signature.

MODEL.

ORDER FOR AN OFFENSIVE COMBAT.

Detachment Orders No. —.

Place—Date—Hour.

No distribution of troops.

I. *What is known of the enemy* (in detail) and what is known of our troops.

II. *Resolution of Commanding Officer of detachment* (generally indicate briefly which wing of the enemy is to be enveloped). Instructions for advance guard which now ceases to provide for security.

III. *Instructions for the artillery* (first position first objective, generally enemy's artillery).

IV. *Instructions for infantry* (indicate in a general way means to be employed for the main attack; state precisely the direction of the attack and its objective; if there be several battalions, designate the officer charged with the execution of the main attack).

V. *Instructions for the reserve* (designate troops to compose it and its position).

VI. *Instructions for cavalry* (the greater part to cover one of the wings; patrols to cover the other).

VII. *Instructions for ammunition wagons* (for locating field hospital in such cases where provision in regard to them can be made).

VIII. *Instructions for trains.*

IX. *Where Commanding Officer is to be found* (generally close to first artillery position).

How order is communicated.

Signature.

MODEL.

ORDER FOR THE OCCUPATION OF A DEFENSIVE POSITION.

Detachment Orders No. —.

Place—Date—Hour.

No distribution of troops.

- I. *What is known of the enemy and our own troops.*
- II. *Intention or plan of detachment commander; indication of the position to be defended. Under certain circumstances dissolution of the order of march.*
- III. *Instructions for the artillery (position; objective; whether or not gun pits and emplacements will be constructed).*
- IV. *Instructions for infantry of the 1st line (distribution for sections of front; indicate defensive works, if any, stating of what they shall consist).*
- V. *Instructions for the principal or main reserve (indicate what troops are to compose it; position).*
- VI. *Instructions for engineers (as to defensive works, bridges to be constructed in rear, etc.).*
- VII. *Instructions for cavalry (as covering one wing with large portion, other wing with patrols).*
- VIII. *Instructions for ammunition wagons and position of field hospital.*
- IX. *Instructions for trains.*
- X. *Where Commanding Officer is to be found.*

Manner of communicating order.

Signature.

Colonel Arthur L. Wagner, Assistant Adjutant General, U. S. A., was selected as chief umpire.

Senior umpires, aided by numerous assistant ones, were selected for the "Blues" and the "Browns."

During the action, an umpire was present with each body of troops. At the end of the action the umpires for each side, through their senior umpire, made a report, which was handed to Colonel Wagner, chief umpire, who made his report upon the entire problem, and which was read to all the officers on the evening of the day following the action.

The reports of the commanding officers of the opposing forces were likewise read.

I inclose the reports of Colonel Wagner as chief umpire.

I am hopeful that Colonel Wagner's lecture on strategy will be published in full, as any attempt to give a synopsis of it would be entirely inadequate.

During the field maneuvers I was with the National Guard officers, in charge of Captain William M. Wright, Second Infantry, A. D. C., who explained the problem of the day, disposition of the forces, the terrain, etc.

FIELD HOSPITAL.

The model field hospital was installed for a brigade, and was placed in three regimental sections.

The total strength of the field hospital consisted of three medical officers, six noncommissioned officers, and forty-eight privates.

Three hospital tents, fourteen by fourteen feet, were placed end to end upon board floors, and eighteen cots were placed therein, twelve being crosswise and six lengthwise. To the rear, at a distance of about twenty feet, three more tents were similarly placed and arranged with floors and cots. Each regimental section thus had six tents, divided into two wards of three tents each. Each section had thirty-six cots, or one hundred and eight cots for the brigade.

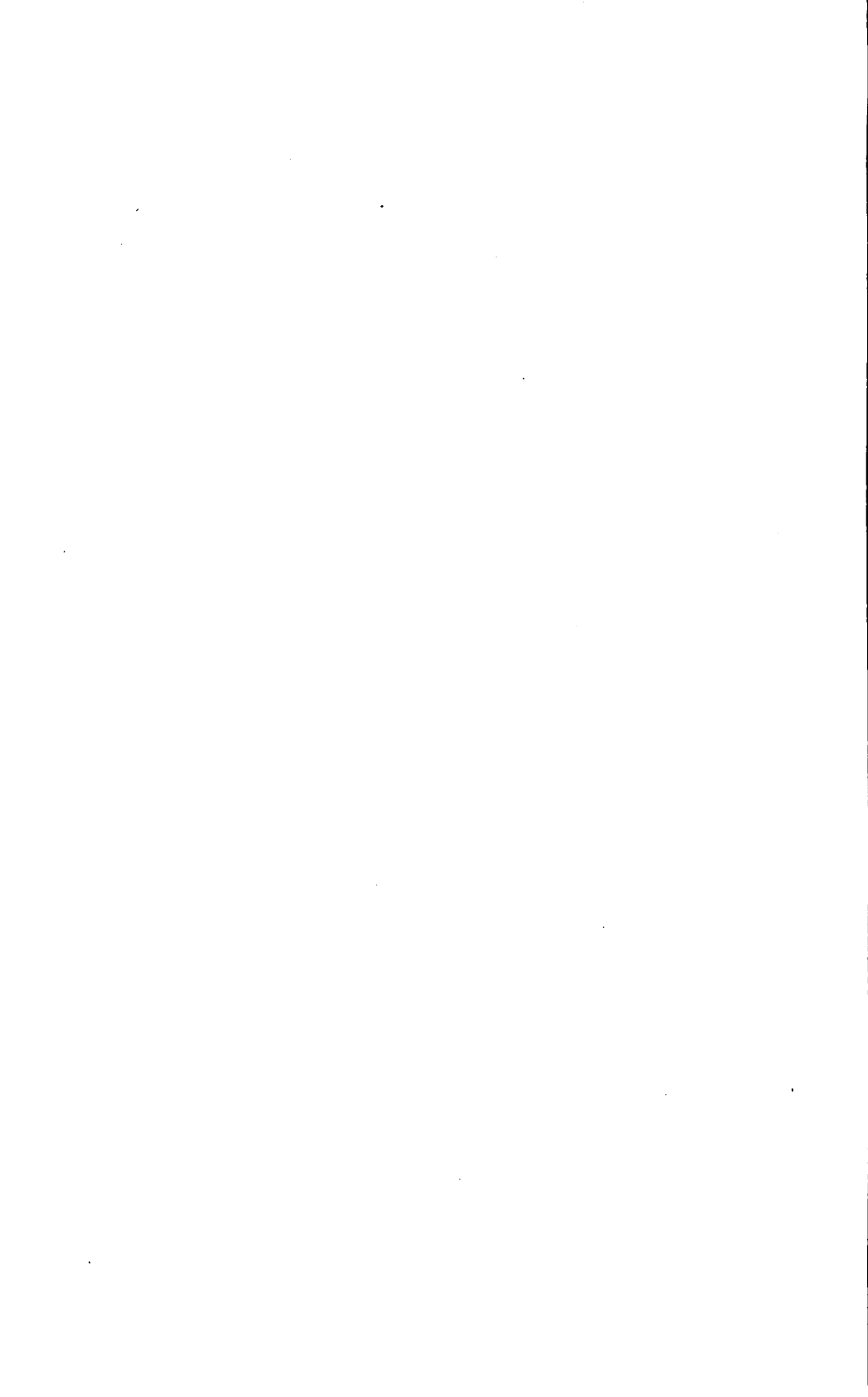
The regimental sections were placed side by side, with an interval of about ten yards. At the head of each section and distant about ten yards from the ward was a tent. These tents served the following purposes:

One, called the dispensary tent, contained the regimental medical chest, the regimental surgical chest, detachment chest for detached use in the field, sterilizer chest, and two cases of extra dressings. This tent had the acetylene gas outfit, the whole of which was packed in one case about twenty-four inches by eighteen inches by twenty-four inches, which contained forty pounds of carbide, enough to run ten lights of twenty-five candlepower for eight days of five hours each. The gas was led from a reservoir in this chest to the wards by means of rubber tubing suspended from the tent poles. The tent was also used as an operating room in an emergency case, having the necessary furniture and appliances.

Another one of these tents was used as an administration tent, and contained a field desk, etc., in which the following segregation was employed as to accounts: (1) Office records; (2) Dispensary and operating tent; (3) Stores and reserve supplies; (4) Wards; (5) Kitchen and mess; (6) Animals and transportation; (7) Quarters for noncommissioned officers and men. The third tent was used for stores and reserve supplies, and had drugs for a supply of three months, boxed in units of one third of total supply, so that one month's supply could be set aside if required. The reserve chests had contents marked on the outside on the lid and on the front side, and alphabetically arranged. Two rubber folding bathtubs were boxed in one chest, there being two chests for the use of the brigade. All furniture and bedding were carried in what are called tent units. One tent unit consists of two cases—one for folding field furniture and one for blankets, bedding, etc., six cots, one table, one chair, twelve blankets, twelve sheets, six pillow sacks, six bed sacks (to be filled with straw, if necessary), six rubber blankets, six



FIELD HOSPITAL AND AMBULANCE COMPANY.
Camp Root, Fort Riley, Kansas.



suits of underwear, six pajamas, and six towels. Reserve of bedding is carried in reserve stores. One commode chest for each three tent units. All cots had mosquito bar attached to them, and which formed a part of the cot. In other words, an end section of the cot represented two letter X's placed on top of each other, the smaller one being on top, and supporting the mosquito netting, and the bottom one being the support of the cot.

The tents and wards were illuminated by means of acetylene gas and were heated with Sibly stoves.

The mess tent was simply a fly, conveniently stretched over poles, and contained one mess chest, which has all tableware for one hundred patients; one Buzzacott field range with a capacity for one hundred and fifty patients, and one food chest containing articles of light diet.

I was informed that this hospital, if used as a field hospital alone, is of sufficient capacity for a command of six thousand men.

My thanks are due to Captain Frederick P. Reynolds, commanding, and First Lieutenants C. E. Marrow and Thomas Devereux, Assistant Surgeons, for many courtesies extended.

AMBULANCE COMPANY.

This is a new organization, which does the first aid work for the brigade or whatever organization to which it is attached, and is the medium through which the wounded are conveyed from the regimental surgeons on the battlefield to the field hospital.

The ambulance company is provided with surgeons, litters, litter-bearers, ambulances, etc.

The company is organized as follows: One captain and two first lieutenants, all surgeons; one quartermaster, who is a line officer and who also acts as commissary and ordnance officer; fifteen noncommissioned officers, classed as follows: ten acting hospital stewards and five "field stewards"; sixty-five privates.

Officers, noncommissioned officers, and orderlies are mounted.

Each medical officer is accompanied by an orderly, who carries an orderly pouch. This is a canvas-lined, waterproof pouch, containing first aid packets, diagnosis tags, pocket case of instruments, bandages, etc.—altogether eighteen articles.

The equipment consists of nine ambulances, two "travail," and four escort wagons, one of which is a medical supply wagon.

The tentage consists of one hospital tent, six conical wall tents, eight wall tents nine feet square, and four wall tents for officers.

In addition to the medical and surgical equipment, the company carries a complete saddler's, smithy, and wagonmaker's outfit.

The company can be subdivided into three sections, each to act independently, in which case the captain commands the second section, the

senior lieutenant the first section, and the junior lieutenant the third section.

One section consists of one medical officer, three noncommissioned officers, and eight privates (each carrying a corps pouch), and one cook, which gives two litter squads of four men each in charge of a non-commissioned officer. It has three ambulances and one escort wagon assigned to it.

A "corps pouch" contains first aid packets, a case with forceps and pins, spirits of ammonia, etc.—about eight articles altogether.

The line officer in action is in charge of transportation.

The company is "self-contained," and can move in forty-five minutes as a maximum from the sound of the "general." The dressing station can be got ready for patients in fifteen minutes, and can be struck and loaded on wagon again in seven minutes.

The "travail" is patterned after the Indian wickiup. It consists of two parts, a trail 11 feet, and a front piece 8 feet long, having a total length of 16 feet 9 inches when assembled. It is a litter, one end being put over a mule, which pulls it, and the other dragging on the ground and having one of the trail shafts a little longer than the other, so that in crossing a ditch the jar will be less.

Three grades of ambulances were used. The first style carried what is known as "Old" chest and two patients. The second style carried four patients and no chest. The third style carried four patients, had seats on side, which are parked, and the patients are lifted into the ambulance on the same litter upon which they are brought from the battlefield (in the second style they had to be taken out of the battlefield litter to be lifted into the litter on top tier). Hammocks are swung on the sides for the accouterments of the wounded. Beneath the wagon, water is carried in cans lodged in racks, so arranged that the cans can be tilted out of the rack and cleaned, which can not be done in the others. It has been suggested that the cans be replaced with casks, owing to the cans leaking soon after handling. Under the wagon and in front of the water racks are racks holding two rectangular galvanized-iron boilers with lid, each inclosed in an iron grate; one boiler contains a metal box containing "hospital stores" such as beef extract, sugar, tea, etc., and matches, the other boiler a metal box with "surgical dressings." The grates are used to build a fire under, and the boilers are placed upon them to heat water in, etc. Escort wagon carries a little kindling for this purpose.

Previous to an engagement the dressing station is established at the nearest and most accessible point to the firing line as will admit of full protection. In advance of this and near the firing line the ambulance stations are placed, one to the rear of each regiment. The nature of the ground governs these, and they are placed as far as the ambulances can go. Connection is made between the regimental aid stations and ambu-

lance stations by means of twenty-one ambulance bearers. When the distance is short, or the ground very rough, litters are used, otherwise the "travail."

After the action, the wounded having been collected at the dressing station are taken to the field hospital. The regimental surgeons affix the diagnosis tags. No operations are practical on the firing line, and only those of the most imperative nature are done in the dressing station, at which the captain and possibly one assistant are stationed.

All escort wagons are at the dressing station, unless the sections are acting independently, in which case each section establishes its own dressing station.

When the wounded have all been removed from the regimental aid stations to the field hospital, the company camps at the field hospital and assists that organization.

The officers of this company are Captain James S. Wilson, First Lieutenant J. B. Clayton, First Lieutenant Cary M. Snoddy, Assistant Surgeons, to whom I wish to express my thanks for this information.

BASE HOSPITAL.

The base hospital was laid out in the form of a cross, two wards to each arm, having a total of eight wards. Each ward consisted of two 14-foot tents, placed end to end, with a fly connecting the wards. Each tent had six cots, and was floored. An isolation tent was pitched at some distance from the main wards, which had six cots; the total being one hundred and two cots.

This base hospital was pitched in front of the Post hospital of Fort Riley, a stone structure, having ample accommodation for sixty patients. Combining the two, the base hospital had a capacity of one hundred and sixty-two cots. All cooking was done in the Post hospital.

Major P. Shillock was in command of the Post hospital, assisted by three junior officers. There was a steward in charge of the base hospital, likewise one for the Post hospital.

There were three men to each ward—one for day, one for night, and one for police duty.

The average number of patients was about forty-five in base hospital; maximum being forty-eight, and minimum forty.

The health of the camp was something remarkable, the sick list ratio being only 2.4 per cent for the entire camp.

Each independent organization had its own hospital in addition to the above.

DIAGNOSIS TAG

contains the following directions, to wit:

The diagnosis tag is to be attached as soon as practicable to every sick or wounded man on the battlefield. The diagnosis must, as a rule, be entered by a medical officer.

The red border is left on and the blue torn off when from shock, severe injury, or other cause, the soldier is, at the time, unable to endure transportation.

The blue border is left on and the red torn off when the soldier requires transportation and can be moved.

Both borders are torn off when the soldier's disability is slight or such that he can walk to the dressing station or hospital.

Under "Diagnosis" the medical officer will give a brief and intelligible description of the seat and character of the injuries or the nature of the disease, and sign it.

Under "Treatment" is to be recorded what is given, especially anodynes and stimulants, and what is done from time to time, by medical officers or attendants, and when proper, it may be indicated what further is needed and the urgency of the case. If necessary, for brevity, the following characters may be used to save time and space:

- X Temporary dressing applied.
- = Permanent dressing applied.
- O Operation needed (amp. liga., etc.).
- OO Operation urgently needed.
- OX Operation done and temporary dressing applied.
- O= Operation done and permanent dressing applied.
- XO Temporary dressing applied and operation needed.
- XOO Temporary dressing applied and operation urgently needed.

The urgency tag is to be used in addition to the usual diagnosis tag as a conspicuous mark to call attention to some case requiring immediate assistance.

The date is important and should never be omitted. When narcotics or stimulants are administered the quantity given and the time should always be stated.

If practicable, the name, rank, company, and regiment of the sick or wounded man should be entered upon the diagnosis tag.

During the maneuvers, the Medical Department established the regimental aid, ambulance, and dressing stations.

The general plan upon which the Medical Department operates can be likened as follows: The wounded are gathered upon the battlefield and assembled at the regimental aid stations established to the rear of the regimental reserves, where the diagnosis tags are affixed by the regimental surgeons. Thus far they are handled by the Medical Department of their own organization. They are then taken in charge by the ambulance company, which conveys them, first by means of litters to the ambulance stations, whence the ambulances convey them to the dressing stations; whence, as soon as possible, they are conveyed to the field hospital, where all operations as far as practicable are performed. When convalescent they are sent to the base hospital, and some finally to the general hospital, or to their homes.

If the human hand be taken to illustrate with, the first section of the fingers represent the regimental aid stations; the second section, the ambulance stations; the third section, the dressing stations; the hand, the field hospital; the arm, the base hospital; and the body the general hospital or home.

I noted particularly the personal cleanliness of the surgeons, their fingernails, hair, etc. The instruments were bright, and all the apparatus I saw was kept in first-class condition.

I take pleasure in acknowledging the many courtesies extended to me by Lieutenant Colonel John Van R. Hoff, Deputy Surgeon General, U. S. A., Chief Surgeon Maneuver Division.

COMMISSARY.

The workings of this department were as follows: All rations were issued from the post commissary at Fort Riley Reservation. As soon as a company entered camp, a requisition blank (form 53) was filled out and approved by the commanding officer, without which no ration could be issued. When the requisition reached the post commissary he figured it out and notified the company when he would be ready to issue (which was generally two hours). The quartermaster sergeant of the company then brought his wagon and men to handle its supplies.

The post commissary then issued the supplies on duplicate issue slips, which showed how much the company was entitled draw, how much it drew, how much it saved (which in the case of fresh beef and a few other things it got no savings). The quartermaster sergeant drew the rations, signed duplicate issue slips, and retained one.

The foregoing method of issuing was based on one company, troop, or battery or detachment. If, however, a regiment arrived, each company, troop, etc., carried out the above plan, but sent the company ration return to its regimental adjutant, who consolidated them all upon one blank (form 66). The adjutant then sent it to the post commissary, after signature by regimental commander.

The post or camp commissary is called a depot commissary when he issues to several regiments; this title still holds, no matter how great the number of organizations.

When two or more organizations are together, the company ration returns must be consolidated at the headquarters, and the consolidated returns sent to post or depot commissary.

After the depot commissary had checked the consolidated return and figured the rations in bulk, which required about two hours after he received the return, he notified the regimental commissary, who brought his men and wagons and drew these supplies in bulk, and in his own camp divided them up and issued them to his regiment by company.

When the depot commissary issued in bulk to the regimental commissary, the duplicate issue slips were made out by the depot commissary and signed by the regimental commissary as his receipt for the supplies which he issues to the companies of his regiment on the company ration return which he procured from the regimental adjutant.

The regimental commissary made the same duplicate issue slips and had them signed, as in the case of the post commissary issuing to a company, as already explained.

Rations were issued on a basis of ten days' supply, whenever possible. Bacon was issued for three days out of ten. Savings on rations are generally made on bacon, flour, and coffee, for which a money allowance is made, which is used in the purchase of other articles of food.

It is often necessary to convert rations into bulk and bulk into

rations, and for this purpose the "Army ration conversion table" is published, by the aid of which any combination of men and rations can be figured in an instant.

There are four kinds of rations issued: Garrison ration, value 20 cents; field ration, value 20 cents; travel ration, value 40 cents; emergency ration, value 26 $\frac{3}{4}$ cents.

In case of sickness the adjutant general orders the commissary to furnish travel rations to the sick soldiers returning to their stations. Travel ration is issued based upon length of journey and number of men. When not practicable to furnish the travel ration, money is furnished the soldier at the rate of \$1.50 per day for meals en route. When the travel ration is furnished, 21 cents a day in money is allowed each soldier for coffee.

Every post commissary has a "sales room" and an "issue room." He sells to officers and enlisted men of the army, either for cash or monthly credit. Married soldiers may draw their rations separately, which are deducted from the company and given to the soldiers. Civilians authorized to purchase, such as teamsters, blacksmiths, etc., can get supplies by paying ten per cent increase on commissary prices. These men, teamsters and blacksmiths, if drawing less than \$60 per month, are entitled to rations.

In issuing supplies the post commissary furnishes the packages, boxes, etc., but no transportation or men.

The following notes of the lecture given by Captain H. G. Cole, of the commissary department, were jotted down by me:

The army moves on its belly.

The food is classified as follows: (1st) Articles with reference to health and appetite; (2d) Supply must be adequate and the cost reasonable; (3d) There must be variety and flexibility.

As to dietetics, it is not an exact science. Theory helps some, but you can not rely upon it entirely.

Articles must be such that they can be given to the soldiers in good condition; and furthermore, they must have keeping qualities.

There must be a variety in standard foods.

A flexible and varied ration is difficult to provide as the firing line is reached.

The sugar ration has been increased since the Spanish war.

The traveling ration is issued to the troops who have no cooking facilities, and consists of only six articles.

The emergency ration is to be issued only when no other ration can be had, and is a very palatable ration, and consists of three cakes of chocolate, and dried beef and cracked wheat pressed into cakes.

The rations in the tropics are increased by a hundred pounds of ice to each company daily.

No matter into what country our troops are sent, the natives flourish on our rations.

Officers are detailed to the purchasing depots, and each division has a regular officer detailed.

San Francisco is the largest purchasing depot, New York second, and Chicago third.

All stores are purchased after advertisement in different papers.

One of the clauses in the specifications of the commissary department is that the crescent must be marked on all commissary stores, packages, etc.

Expert knowledge is required to know even standard foods as to adulteration.

Experts are required in the purchase of coffee, etc., also to prevent the use of preservatives injurious to the stomach.

All meats are purchased in either Chicago, Kansas City, or Omaha.

Bacon suitable for the tropics was hard to get. Inspectors are employed at all packing-houses.

Provision is made for lacquering the cans, as all canned goods shipped to the tropics must be lacquered.

QUARTERMASTER'S DEPARTMENT.

The quartermaster's department was in charge of Captain Chauncey B. Baker, Chief Quartermaster.

Between September 3 and September 18, 1902, this department laid out the camp; laid 53,000 feet of water pipe for it; floored hospital tents; built cook house, and tables and benches for officers' mess; dug one hundred and seventy-five sinks; pitched tents for visiting officers, etc.; and let contracts for the disposal of the garbage, for the furnishing of wood, hay, oats, etc.

Before the arrival of any troops in camp five circular letters were prepared by the chief quartermaster, and handed to the commanding officers of troops upon their arrival at Fort Riley by representatives of the chief quartermaster, who also conducted these officers to their camp site. The following are copies of the circulars:

WAR DEPARTMENT, OFFICE OF CHIEF QUARTERMASTER,
MANEUVER DIVISION,
FORT RILEY, KANS., September 19, 1902.

Memorandum for Commanding Officers of Troops Coming into Camp.

Promptly upon arrival of organizations in Camp of Maneuvers, Quartermasters of organizations should call on the Chief Quartermaster for the following:

Frames for sinks,
Slop barrels,
Oil for burning in sinks,
Lime for use in sinks,
Urinal cans.

These will be supplied at Division Headquarters.

Provision has been made for a scavenger who will remove dry garbage from the company kitchens.

CHAUNCEY B. BAKER,
Captain and Quartermaster U. S. A.,
Chief Quartermaster.

The context of the second circular is as follows:

There will be sufficient wood placed at each camp for immediate use of each organization, after which organizations will haul their own wood. Instructions will be given at the office of the Chief Quartermaster in camp. Grain and hay will be delivered to organizations in camp. It is requested that Quartermaster call promptly at the office of the Chief Quartermaster to arrange the details for issue of wood and forage.

The context of the third circular is as follows:

It being the intention of the Commanding General to assemble all transportation in a central corral, Quartermasters of organizations are requested to report to the Chief Quartermaster at Division Headquarters, upon which the necessary arrangements will be made to carry out the instructions of the Division Commander.

The context of the fourth circular is as follows:

The Chief Quartermaster has had dug in each camp, for immediate use of troops arriving, one sink. It is believed that this will serve to prevent men from straying from the command.

The fifth circular, which I did not obtain, requests protection of pipelines.

All wagons were parked in one general corral, teams of each organization separately, and subject solely to the orders of that quartermaster. At the same time they are all available for any emergency duty upon communication from the chief quartermaster.

After baggage was hauled to site and wagons emptied, the quartermaster of the organization reported to the chief quartermaster for directions as to parking wagons in general corral; upon receipt of which, he proceeded to the general corral.

The supervision of this general corral was under an experienced sergeant, who had no authority other than of a general supervisory character. Each organization kept its own forage separate in the corral.

Every organization had to bring its own equipment. The chief quartermaster supplied only the division headquarters and such brigades as were organized on the ground.

Organizations not fully supplied for the encampment made requisitions in advance, and supplies were shipped to Fort Riley and turned over to the organization direct upon accompaniment of proper receipts.

Forage and wood were issued by the chief quartermaster upon signed requisition duly approved.

Each organization upon arrival in camp was furnished with one day's supply for immediate use, and informed that further issues would be made only upon presentation of proper papers.

Wood, hay, and oats were placed in one forage concentration tent, in charge of a post quartermaster sergeant detailed for that duty.

One post quartermaster sergeant was on duty in the chief quartermaster's office, who had charge of all property and papers, and who receipted for all supplies from transportation sources other than forage.

Another post quartermaster sergeant was in charge of and issued lime, oil, sink frames, and such articles as were kept on hand for use from time to time, tentage, etc. He also looked after policing of headquarters and visiting officers.

Transportation was handled by the chief quartermaster direct.

The chief quartermaster of each military department furnished the transportation for the troops arriving at Fort Riley. Departing, the chief quartermaster furnished it.

To enable the chief quartermaster to arrange for the return transportation, each commanding officer furnished a list showing strength of command, number of animals, etc., and equipment required. This was checked over by the chief quartermaster to see that no more than was necessary was asked for. The chief quartermaster then made out a railroad equipment sheet, of which the following is an example:

CHIEF QUARTERMASTER'S RAILROAD EQUIPMENT SHEET.

Location.	Officers and Men.	Route.	Time of Departure.	Equipment Required.	Organization.
FORT D. A. RUSSELL.	302	U. P.	7:30 A. M.	7 Tourist sleepers. 1 Standard sleeper. 1 Baggage car. 1 Box car (large). 2 Flat cars. 2 Horse cars.	18th Infantry.
FORT LOGAN, Colorado.	477	U. P. and D. & R. G.	1st Section 8:00 A. M. 2d Section 8:30 A. M.	2 Standard sleepers. 12 Tourist cars. 2 Stock cars. 4 Flat cars. 2 Box cars (large). 2 Baggage cars.	18th Infantry. Tourist sleepers for first section should be 14-section cars.
FORT ROOT and FORT RENO.	260	U. P. and C., R. I. and P.	9:30 A. M.	FORT RENO. 1 Standard sleeper. 4 Tourist sleepers. 1 Baggage car. 1 Stock car. 1 Box car. FORT ROOT. 4 Tourist sleepers. 1 Box car. 1 Baggage car.	22d Infantry.
FORT LEAVENWORTH.	240	U. P. and M. P.	10:30 A. M.	6 Coaches. 17 Flat cars. 2 Box cars. 2 Baggage cars.	Engineer's.

which enabled him to provide the necessary cars and which showed the time of entraining for each organization. He also prepared plans which showed the location of each organization's equipment at the railroad depot, the arrangement of the cars, and the time when the cars would be switched in place.

This department received and distributed 500 cords of wood, 300,000 pounds of oats, and 500,000 pounds of hay.

There were eleven hundred and sixty-six horses and mules in camp.

Between September 3 and October 10, 1902, the correspondence through the chief quartermaster consisted of one hundred and seven telegrams, three hundred and ten letters received, and two hundred and fifty letters sent. This does not include requisitions for supplies, nor any memorandum papers. The office force consisted of one clerk and three quartermaster sergeants, having office furniture to the extent of one field desk, one file case, and one typewriter.

The following memoranda I noted concerning quartermaster's stores:

Five wall tents were packed in one box, which weighed 250 pounds; fifteen tent flies were packed in one box. Poles for five tents were tied together in one bunch. Sibly stoves were nested in units of three. Stovepipe is crated; no elbows being carried.

I wish to express to Captain Chauncey B. Baker, Chief Quartermaster Maneuver Division, my great appreciation for the many courtesies extended to me.

Owing to the inclemency of the weather, the following paper, prepared by Captain Chauncey B. Baker, Chief Quartermaster, upon the "Scope and Duties of the Quartermaster's Department," was not read:

It is not possible, in the compass of a single paper, to afford any material instruction as to the details of the work of the quartermaster's department. All that can be done is to take a comprehensive glance at the general scope of the departmental duties, and point out some of the more salient features.

The quartermaster's department is charged with the duty of providing means of transportation of every character, either under contract or in kind, which may be needed in the movement of troops and material of war. It furnishes all public animals employed in the service of the army, the forage consumed by them, wagons and all articles necessary for their use, except the equipment of cavalry and artillery.

It furnishes clothing, camp and garrison equipage, barracks, storehouses, and other buildings; constructs and repairs roads, railways, bridges; builds and charts ships, boats, docks, and wharves needed for military purposes; and attends to all matters connected with military operations which are not expressly assigned to some other bureau of the War Department.

It is immediately apparent that the duties devolving upon an officer of the quartermaster's department are of so varied a nature and so wide in their scope that necessity exists for the application of the most approved business principles to the execution of the requirements imposed.

The first and most urgent consideration in the inception of any undertaking is the organization of the enterprise along such lines as will enable one responsible head to administer affairs in such fashion as to economize time, avoid friction, minimize expense, and produce the highest possible degree of efficiency as the result of the means at hand.

In order to secure so desirable an outcome, the most thorough system should be introduced and maintained, and the work should be accordingly organized under general heads or subdivisions for the purpose of convenience and accuracy in administration.

In the office of the quartermaster general—the head of the department—it will be found that the work is subdivided into fourteen different branches, as follows: (1) Money accounts; (2) Clothing supply; (3) Rail and river transportation; (4) Regular supplies; (5) Property returns; (6) Finance; (7) Reservations; (8) Cemeterial;

(9) Ocean transportation; (10) Records; (11) Barracks and quarters; (12) Inspection and personnel; (13) Miscellaneous claims; (14) Architectural, draughtsmen, etc. These subdivisions are practically self-explanatory.

In the office of the quartermaster general are a half dozen or more officers, captains and field officers, attached as assistants, each of whom is charged with the conduct of one or more of the branches noted. At the head of each branch is a principal clerk, responsible for the conduct of its affairs. All communications received come first to the chief clerk of the department; matters of large importance are brought at once to the attention of the quartermaster general; routine business passes through channels for necessary record, direct to the various subdivisions of the office; if of ordinary nature, it is at once acted upon by the officer directly in charge; if of considerable importance, it is brought by him before the quartermaster general. In this way the quartermaster general can give personal attention to all matters of material significance, and minor affairs are disposed of without consuming his time. By this means all functions of the office are clearly established, and a definite responsibility is fixed for every act. Errors and omissions can be readily traced to the party at fault, and the likelihood of their recurrence is reduced to a minimum.

It is equally important that the work of every quartermaster's office be organized along similar general lines of systematic order. There should be the definite responsibility of his clerical force, if he have clerks, for certain lines of duty in his office; of his other subordinates for the particular work assigned, each responsible in his own sphere, and each reporting in turn to his superior, from the lowest teamster to the principal clerk; each separately held to account for his own special duty, and yet all centering in one headship, of the quartermaster himself; each expected to carry out his independent routine so that only such matters as require executive action need come before the quartermaster, and yet the whole so disposed that an ordinary, trivial matter, upon assuming any unusual phase of importance, shall not be able to escape the immediate attention of the officer himself.

Having clearly grasped the importance of a rigid system in the conduct of his affairs, and disposed his office and working force accordingly, be it great or small, the quartermaster is in position to consider the extent of the duties he may be called upon to discharge, and the most effective means of meeting the demands upon him as they may arise. He will find that by no means the least of the requirements recited in the quartermaster's creed is that all-embracing paragraph which relates that the quartermaster's department shall "care for all matters connected with military operations which are not expressly assigned to some other bureau of the War Department."

In the exercise of the practically discretionary powers thus broadly set forth, it is often hard to draw the line as to where the quartermaster should take up a work, and just where his acts should cease. However, this is only one of many points which arise wherein the judgment of the quartermaster must come into play, and wherein the best interests of the service will be consulted in making a decision as to the course to be pursued.

The question of the furnishing of all classes of quartermaster's stores and supplies required must promptly receive the attention of the quartermaster. This duty is one which, for garrison, is guided in all its details by army regulations and current orders; for the field, it is important to limit all classes of supplies to such as are required for immediate use, and they should be of the simplest and most serviceable character. In the effort to do too much there is always the temptation to do something that is unnecessary, and in the matter of furnishing supplies it is fully as great an error to burden an army with a lot of non-essential stores as to provide an inadequate supply. In this matter good, plain common sense is the only proper guide; no absolute rule can be laid down; but the exigencies of each particular situation, in the field, on the march, or under the stress of an active campaign, will readily appeal to the practical consideration of the responsible officers; for example, I may say that in my service I have seen inexperienced quartermasters carefully scanning the regulations and current manuals and orders to discover excuses for requiring additional supplies—I have seen regimental quartermasters in the field who were in actual need of a dozen shovels and who yet made requisition for ten times that amount, because there existed authority for the supply of that number; and so on through the entire list of articles, practically

all of which were subsequently returned to depots or turned over to other quartermasters in the original packages in which received. On the other hand, I have seen a green regiment, in the expectation of early active service in a foreign country, come into camp without shoes, blankets, or uniforms; clad in ragged clothing and provided with hats of pathetic dissimilarity; without tentage of any kind, and unsupplied with any form of transportation whatsoever; without food and without cooking utensils. And in this condition of total unpreparedness, when everything so vitally necessary to the soldier should have been urgently called for, the first request made upon the quartermaster's department was for none of these indispensable essentials, but for a refrigerator, and for a wheelbarrow to roll the ice.

The United States is the most liberal government in the world in the matter of the quality, quantity, and variety of the supplies of every character furnished its army in the field, and the necessaries, comforts, and conveniences provided at its garrisoned posts. This is not only true of the quartermaster's department, but applies to all supply departments. The manifest object aimed at is the attainment and maintenance of the highest degree of efficiency in its forces. The actual requirements in each instance will be seen to differ widely, yet with precisely identical ends in view; in brief, it is quite evident that the soldier in garrison should have furnished him all reasonable supplies of every character, the most suitable quarters affording the greatest degree of comfort, and every facility for recreation and relaxation provided for by existing authority; in the field the conditions are reversed, and the great fighting machine called an army should be stripped of all its superfluous impedimenta, and the mechanism under such conditions will be found to operate most smoothly when provided with just what is necessary in the way of supplies and equipment. In this case the necessaries are considered and the comforts are dispensed with.

When the great war captain of our nation, General Grant, took command of the eastern army, his first study was not what he could add to the impedimenta of the army that had been more than three years in trying to march from Washington to Richmond, but what he could dispense with without crippling its efficiency. The result was that the allowance of transportation to each regiment for the transportation of its impedimenta was made one army wagon, and with that allowance of transportation in the Army of the Potomac was fought the last year of the war. It may be safely said that, other things being equal, the first body to arrive on the scene of action will be that which is least incumbered with impedimenta; no military man has ever slighted the importance of being prepared to strike the first blow.

The quartermaster, having carefully considered the subject of supply under the various conditions to which I have briefly adverted, the next point for him to solve is the question of accountability and responsibility, which embraces both property and funds. With reference to the matter of funds, the question for the quartermaster is simply one of careful compliance with existing regulations as to custody of official checks and cash, and with regard to methods to be employed in making disbursements, transfers, and deposits; and of carefully providing himself with the written approval of higher authority to cover his official acts pertaining to financial matters.

The question of property accountability is one which is possessed of perhaps more complexity, but by proper measures the responsibility of a quartermaster for property for which he is accountable, can be confined practically to that locked within the doors of his storehouses. Every non-expendable piece of property issued to employes, all articles temporarily in use by officers, and other such stores actually issued, but not invoiced, should be covered by memorandum receipts. All discharged employes should clear their property receipts before payment is made them. Memorandum receipts of officers for property not turned back should be filed with the return of the accountable officer, and will relieve him in the premises. Sundry memorandum receipts of the same officer should be consolidated at regular intervals, acting as a continual reminder to the officer, of the property for which he is responsible. Careful expenditure lists, timely action in the matter of the condemnation of wornout and unserviceable property, and the use of other such facilities provided by regulations, will, when coupled with the safeguards mentioned, make the matter of property accountability and responsibility not a difficult one to compass with success and credit. No quartermaster should hesitate to assume either responsibility or accountability for property when circumstances

so demand, and very simple measures are at hand for his protection in the adjustment of any questions that may arise.

The necessary supplies obtained, the matter of accountability therefor clearly defined, and measures of fixing responsibility clearly provided for, the quartermaster will naturally turn to the other great head under which most of his remaining duties will be classed, namely, that of army transportation. Of all the branches of the work of the quartermaster there is none so important, and to my mind so interesting, as that of the transportation of troops and supplies. Whether this be done by the great ocean transports that have come into existence since the beginning of the Spanish-American War, or by the humble pack-mule, or even where the supplies are carried by the man himself, all these means are connectedly working together for one common purpose; that is, the bringing of the supplies and troops to that point where they shall be of the greatest use to the commanding general of the army. Upon the successful transportation of troops and supplies has depended the success or failure of more than one great army; in fact, it may be safely said that the superiority of one army over another in the matter of transportation will go far toward making that army superior to its opponent, unless in other respects it shall be found very materially deficient.

Upon this subject of army transportation it may be stated that in our service, the quartermaster's department, in addition to a long list of duties recited, and many others that are not specifically set forth, provides all transportation of whatever kind, both for troops and material of war; it supplies all animals used, of whatever character; furnishes transportation by rail and river, by wagon and pack-mule, and supplies ocean transports for beyond-the-sea freight and travel. It is the duty of the department to build roads, bridges, railways, ships, docks, and wharves as a means of transportation. It mans, equips, and operates every style of transport, from the ocean-going steamship down to the coolie that carries the load upon his back. It carries the water that supplies the troops in garrison and camp, and removes the sewage.

In addition to the transportation of its own supplies it is for the quartermaster's department to carry the supplies of every department of the Government when called upon to do so. A commander contemplating a proper and adequate supply for his forces, whether in peace or war, in garrison or on the march, should give timely notice of his intentions to his quartermaster, indicating at what points supplies should be placed and for what period of time. The quartermaster will then, from the general instructions of the commanding officer, carefully consider the matter and estimate the amount of supplies to be carried with the troops and the quantities to be provided at various points, the time when they will reach their destination, when the movement should begin, and furnish the necessary transportation.

In doing all of this, the first subjects for consideration will be the amount and character of the means of transportation available, the country to be passed over, the distance and character of the roads, the difficulties to be encountered, whether from bridges, streams, the enemy, or other obstacles, the probable time required, and so on, and the necessary arrangements will be made accordingly. It is always wise to embrace every possible factor for safety in all calculations regarding transportation. It is the duty of the quartermaster, also, in such cases, to provide for the successful continuous forwarding of supplies as they may be needed.

The young quartermaster in entering upon his duties will find available—varying, of course, with the particular conditions with which he finds himself surrounded—transportation of either one or the other, or perhaps a number of the kinds which have been mentioned. He will have wagon transportation, of course, from which he will derive the full value only by intelligent arrangement and organization.

For a large corral, such as existed for the supply of General Lee's corps in Cuba, and other attached organizations, eleven wagon trains of twenty-five wagons each were required, the railroad facilities being found inadequate. In the organization of a corral of such dimensions, it was necessary to elaborate a system as complete as for the organization of a regiment, as follows:

A superintendent of corrals, in general control. His working staff, composed of:

A corral master, responsible for the cleanliness and orderly arrangement of the corral and good discipline and general supervision of the men and animals within its limits.

A superintendent of transportation, in charge of all trains and teams at work, responsible for their proper equipment and efficiency.

For each train: one wagon master, responsible for its condition and operation; one assistant wagon master, to whom he could delegate some portion of his duties; and twenty-five teamsters. Each teamster was made responsible for his team and also all property in his possession, and by means of delivery tickets for every item of supplies entrusted him for transportation.

A veterinary attended the sick or wounded animals.

A forage master was responsible upon signed receipts for all forage and its proper feeding.

A superintendent of shops directed the work of blacksmith's, saddler's, wheelwright's, painter's, and other shops, and within each shop one man acted as foreman and was held responsible for the work.

A foreman of laborers was held responsible for the unskilled labor.

A property clerk kept the individual property account of each employé, made requisitions for materials required, and kept stock of all property on hand.

Each of these employés had well-defined duties and no conflict could arise. This system of wagon trains, operating over a distance of eleven or twelve miles, rough road, was able to carry a greater quantity of supplies than could be transported by a single line of railroad in operation on a parallel line; and in its state of reduced numbers, was finally disbanded on May 20, 1902, after handling many millions of pounds of stores per month, during nearly four years' operations, without the loss of a single article except one sack of coffee and a few minor articles of commissary supplies, for which the teamsters promptly paid the full value in each case.

The organization of pack trains is along similar lines, the principles of responsibility and organization being applied in the same manner, and it is needless to say with the same gratifying results.

You have all had sufficient opportunity for observing the scope and importance of this single function of the quartermaster's department to realize the necessity for the most constant attention to this subject in order that the welfare of the command may not suffer. It is not sufficient that the quartermaster do the things that he is commanded to do by his superior officer, but he must himself be a man of discretion, originality, and intelligence. No member of the staff has it in his power to relieve his chief of as much detail and annoyance as has the quartermaster. It is a well-established principle that the commander of a force, whether large or small, should be freed from the annoying details of the various staff departments as far as may be practicable, in order to enable him to devote his time and attention to the larger questions pertaining to his command, whether they be the strategic features of a campaign, or the interior matters pertaining to drill discipline and administration.

Finally, let me say to my brother quartermasters, that we have as an inspiration in our task practically unlimited opportunities for the constant use of all the inventive, creative, executive, and administrative abilities that each man may possess, and for the exercise of all the faculties of his intelligence. Receiving the raw recruit unprepared and unequipped, it is the duty of our department to provide him with the necessary clothing and fit him out in the uniform of a soldier, give him shelter of tentage or quarters, supply him with a bed and bedding, with light for his illumination, fuel for his warmth and to cook his food; ranges, ovens, and utensils in which to prepare it, and with the tableware from which to eat his meals; to furnish him mounts and draft animals and the forage they require. Our department carries the soldier and his equipment by pack-mule, wagon, rail, river, and over-sea transportation to distant shores and the scene of active service; provides the drums that roll the call to battle, and the flag that he follows to victory; his duty done, bears him back triumphantly to the mother, or sweetheart, or wife in the home land that he loves; or should he fall in battle, or die, not less gloriously but more sadly, from the onslaught of some insidious disease, it is the quartermaster's department that furnishes his last narrow tenement, bears the sacred remains home to lie in his native soil, provides the grave in which he sleeps, and keeps green the sod above his resting-place.

ENGINEERS.

Following is the organization and equipment of the First Battalion of Engineers during the Fall maneuvers, September and October, 1902:

I. HEADQUARTERS, FIELD, AND STAFF.

ORGANIZATION:

- 1 major, mounted, commanding the battalion.
- 1 first lieutenant, mounted, as adjutant; also in charge photo and map departments.
- 1 first lieutenant, mounted, as quartermaster and commissary.
- 1 sergeant major, mounted.
- 1 quartermaster sergeant, mounted.
- 1 acting commissary sergeant, mounted (man and mount counted in strength of "B" Company).
- 1 sergeant photographer, mounted (man and mount counted in strength of "B" Company).
- 4 draftsmen (2 from "A," 2 from "D" Companies).
- 1 battalion clerk (from "B" Company).
- 1 operator, rotary neostyle (from "C" Company).
- 1 mounted orderly (man and mount from "C" Company).
- 1 enlisted teamster (from "C" Company).
- 1 civilian chief packer, having supervisory control of packing.
- 1 civilian wagon master.
- 2 civilian teamsters.

WAGONS:

- 1 6-mule wagon for Headquarters and map departments.
- 1 escort wagon for miscellaneous stores.

ANIMALS:

- 3 private horses.
- 4 Government horses.
- 1 riding mule.
- 10 draft mules.

EQUIPMENT:

Map: Drafting outfit complete for four draftsmen, with paper, ink, etc. Blueprint frame, 32" x 42"; washing trays; and prepared paper.

Photo: Outfit for making plates and prints from 5 x 7 to 10 x 12. (*Note.*—This outfit was hastily gotten together, and to a large extent consisted of discarded apparatus from river and harbor district officers, and was not at all adapted to field work. A proper outfit to be requisitioned for.)

Survey and Reconnaissance: 1 transit, 1 wye level, 1 level rod, 1 stadia rod, 2 odometers, 6 prismatic compasses, 2 clinometers, 6 cavalry sketching cases, etc.

Bridge Train: (The bridge train was attached to Company "C," the company designated for the maneuvers as the "Bridge Company." Being only temporarily assigned to the Bridge Company, the bridge train is counted in the battalion equipment.)

1 division of the light-bridge equipage, consisting of:

- 1 tool wagon.
- 1 forge wagon (shipped by rail, as there were not enough mules).
- 8 pontoon wagons.
- 2 chess wagons.
- 2 trestle wagons.
- 52 draft mules.
- 1 riding mule.
- 14 civilian teamsters.

1 complete division and 1 incomplete division of the heavy-bridge equipage (shipped by rail, as no draft animals were available).

Engineer Depot: Shovels, picks, mattocks, spades, rope, wire, nails, etc., were shipped by rail to form an engineer supply depot.

II. COMPANY "A."

ORGANIZATION:

- 3 officers, mounted.
- 2 teamsters.
- 1 acting veterinarian, mounted (looked after all battalion animals).
- 19 men in mounted section.
- 2 packers, on riding mules.
- 44 men, in foot sections.
- Total, 3 officers and 68 men.

WAGONS:

- 1 baggage and ration wagon, escort.
- 1 tool wagon, escort.

ANIMALS:

- 23 horses, public.
- 2 riding mules.
- 6 pack mules (4 tools, 2 baggage).
- 8 draft mules.

EQUIPMENT:

- Tool wagons supplied with shovels, picks, mattocks, axes, hatchets, machetes, crosscut saws, carpenter's tools, reconnaissance outfit, and small map-reproducing outfit, tracing tape, rope, tackle, nails, etc., horse and mule shoes, etc.
- Four pack mules, loaded in pouches with earth-working tools, saws, axes, hatchets, rope and tackle, etc., horse and mule shoes, etc.
- Two pack mules loaded with baggage, rations, etc., and small supply of horse medicines.

(Note.—Each company, except "C" (Bridge Company), was supplied with an assortment of tools and supplies for nearly all contingencies. Company "A" had also a small map-reproducing outfit and survey instruments; Company "B," portable blacksmith outfit; Company "D," sandbags, etc.)

III. COMPANY "B."

ORGANIZATION:

- 2 officers, mounted.
- 2 teamsters.
- 23 men in mounted section (including acting commissary sergeant).
- 2 packers, on mules.
- 53 men, in foot sections.
- Total, 2 officers and 80 men.

WAGONS:

Same as Company "A."

ANIMALS:

- 25 horses, public.
- 2 riding mules.
- 6 pack mules (4 tools, 2 baggage).
- 8 draft mules.

EQUIPMENT:

- Tool wagon loaded as that of "A" Company, except that a portable blacksmith outfit was carried instead of the map and survey outfits.
- Pack animals loaded as for "A" Company, except that horse medicines were not carried.

IV. COMPANY "C" (Bridge Company).

ORGANIZATION:

- 2 officers, mounted.
- 2 teamsters (1 for Battalion Headquarters).
- 5 men in mounted section (mounted section not fully organized; horses not arrived).
- 2 packers, on mules.
- 60 men, in foot sections.
- Total, 2 officers and 68 men.

WAGONS:

1 baggage and ration wagon, escort.

ANIMALS:

1 private horse.
6 public horses.
2 riding mules.
4 pack mules (2 tools and 2 baggage).
4 draft mules.

EQUIPMENT:

This company used the tool wagon belonging to bridge train, which contained earth-working tools, carpenter's tools, rope, etc.
One pack mule with demolition outfit—dynamite, fuse, etc., magneto machine, etc.
One pack mule loaded with carpenter's tool chest, complete.
Two pack mules for baggage and rations, etc.

V. COMPANY "D."**ORGANIZATION:**

2 officers, mounted.
2 teamsters.
19 men in mounted section.
1 enlisted chief packer, mounted on riding mule (assisting civilian chief packer).
2 packers, on mules.
48 men, in foot sections.
Total, 2 officers and 72 men.

WAGONS:

Same as Company "A."

ANIMALS:

22 public horses.
3 riding mules.
6 pack mules (4 tools and 2 baggage).
8 draft mules.

EQUIPMENT:

Tool wagon same as for "A" Company, except that instead of map and survey outfits it carried revetting material.
Pack mules loaded as in "A" Company, except for horse medicines.

It will be seen from a perusal of the above equipment, the details of which were kindly furnished me by First Lieutenant H. Burgess, Corps of Engineers, Adjutant First Battalion of Engineers, that this organization was equipped to perform all of the many and varied tasks which come within the scope of military field engineering.

The bridge equipment is divided into two parts: "The reserve train," and "The advance guard train."

The reserve train consists of the heavy wood pontoons, and is designed to accompany large bodies of troops and is equipped to bridge any sized stream over which the heaviest trains carried by an army can pass. A division of the reserve train carries all material necessary for constructing a bridge of eleven bays or 225 feet long, having a roadway of 10 feet between side rails. It carries eight pontoons and two trestles; sixteen wagons especially constructed to transport the material, which weighs 37,971 pounds. The wagons weigh 32,917 pounds, making the

total weight of a division 70,888 pounds. The pontoon wagon with its load is the heaviest, and weighs 5,100 pounds; the forge wagon with its load weighs 3,383 pounds, which is the lightest. The average weight per lineal foot of bridge of all material carried is about 170 pounds. A trestle abutment bay, which is the lightest, when assembled, weighs about 100 pounds to the lineal foot, or 2,000 pounds to the bay; and a pontoon bay, including anchors, weighs about 200 pounds per lineal foot, or about 4,000 pounds to the bay, which is the heaviest.

The advance guard train carries the canvas pontoons; it generally accompanies the cavalry or advance detachments, and is equipped to bridge any stream so as to enable said troops to cross. A division of the advance guard train carries all material necessary for constructing a bridge of eleven bays, or 170 feet long, with a roadway of about 9 feet between side rails. It has eight canvas pontoons and two trestles, fourteen wagons, weighing 24,917 pounds, carrying all the material, which weighs 23,937 pounds, giving a gross weight of 48,854 pounds of equipment. The trestle wagon when loaded is the heaviest, weighing 3,810 pounds; and the forge wagon loaded the lightest, weighing 3,383 pounds.

Average weight per lineal foot of bridge of all material carried is about 140 pounds.

A pontoon bay, including anchor, etc., weighs about 130 pounds per lineal foot of bridge.

The trestle material is the same as carried in the reserve train, with the exception of the chess, and weighs the same practically, *i. e.*, about 100 pounds per lineal foot of bridge.

The bridge material is composed of pontoons or boats, trestles, balks (which are the stringers laid across the trestles and the pontoons, upon which the flooring is placed), the chess or flooring, the side rails (for which balks are used) which hold the chess in position and prevent wagons from rolling off the side of the bridge, abutment sills (upon which the balks rest upon the shore end), ropes for lashings, cables for anchors, etc.

The pontoons are flat-bottomed boats, made of oak, 31 feet long, and have a mid-section which is 15 feet 10 inches long, 5 feet 8 inches wide at top, 4 feet 5 inches at bottom, and 2 feet 8 inches high; the bow is 2 feet 9½ inches in width, and the stern 4 feet 8 inches; and weigh 1,600 pounds each. These boats have a locker in the stern and are provided with oars, boat hooks, anchor, cable of manila rope, and small ropes used for lashings, etc.

The canvas pontoon is formed by stretching a very heavy canvas cover over a framework having the shape of a flat-bottomed boat, of a uniform width at top and bottom. The frame is 21 feet long on top, 18 feet 4 inches on bottom, 5 feet 4 inches wide, and 2 feet 4 inches deep, and is made as follows: Two side frames are joined together by fourteen

cross-pieces called "transoms," fitting into mortises in the frames, and held in place by a rope passed through rings in the ends of the frames. When assembled the canvas pontoon weighs 510 pounds.

The balks, or bridge stringers, are 5 x 5 inch square timbers of white pine, and are of two sizes: One, the long balk, is 27 feet long, having a hardwood claw at each end, distance between claws being 25 feet 8 inches; the other, the trestle balk, is 21 feet 8 inches long, with two claws, spaced 8 inches apart, at each end; distance from center to center of claws is 20 feet. One long balk weighs 130 pounds, and a trestle balk weighs 90 pounds.

The chess, or bridge flooring, are 1½ x 12 inch white pine planks, 13 feet long, with each end narrowed three fourths of an inch on each side for 2 feet, and weigh 38 pounds each.

The trestle consists of a cap, two legs, two false legs, two shoes, and two suspension chains. The cap is formed of two planks 2 inches by 12 inches by 20 feet long, placed together so that there is an opening near each end through which the legs pass; the legs are 3½ inches by 7 inches by 15 feet long, fitted at the top to receive the suspension chains, at the bottom to enter the mortise of the shoe; the shoe is of pine, oblong, 14 by 20 inches, and about 3 inches thick, mortised and with key to fasten to leg, and is intended to prevent the leg from sinking too deeply into the ground. The false legs fill up the space in the cap and give the trestle leg its proper rake. The suspension chains are 8 feet long, are provided with rings in one end to put over top of legs, and toggles at the other to pass through rings in caps. A trestle complete weighs 472 pounds.

Abutment sills are each 5 inches by 8 inches by 14 feet long, and weigh 130 pounds.

Ropes pass lengthwise from one trestle leg to the other, constituting a system of bracing.

Pontoon Bridge Across Kansas River.

The material was all assembled on the left bank of the Kansas River, at a point about one third of a mile south from the railroad depot at Fort Riley post. The center line of the bridge was determined and marked, and the boats were unloaded and material piled on the up- and down-stream sides near the abutment site. An imaginary line was marked out on the up-stream side of the proposed bridge, upon which the anchors carried by the pontoons were dropped into the water. These anchors were placed so that the boat would naturally swing into the position which it had in the bridge, if left free.

The right bank of the stream was about 10 feet high, and an open cut was made from a point 2 feet above water edge leading to top of bank on an easy grade. The left bank was a flat, and about 2½ feet above

the water's edge. The river was 15 feet deep, and had a velocity of about 8 feet a second.

The bridge was begun from the left bank, and seven trestle bays or bents were built out; then fifteen pontoons were placed, finishing the bridge, which then consisted of 300 feet of pontoon bays and 160 feet of trestle bays, having a total length of 460 feet. (There were only seventeen pontoons in the reserve train.)

The pontoon abutment bay on the right bank of the river and the bay joining the trestle with the pontoon were changing their inclination with the rise and fall of the river. (*Note:* The bridge floor on the pontoons rises and falls with the boats, but the bridge floor on the trestles is fixed, being suspended by chains from tops of the trestle legs.) This was provided for by introducing a rocker joint or saddle on the inshore pontoon and on the one next to the trestle; and consisted of two "transoms" placed across the gunwales of the pontoon, and upon them an abutment sill was placed between cleats on the top of the transom, and the balks were lashed to this sill.

The legs of the trestles settled somewhat, which threw the bridge floor out of level, so it was necessary to adjust the trestle caps by means of the suspension chains.

Seven balks were used to each pontoon bay instead of five, the usual number.

Openings were made in the bridge by removing bays, to let the drift-wood pass.

The bridge was held by kedge anchors, weighing 150 pounds each, cast up stream on a line parallel to and about 150 feet distant from the bridge. Every other pontoon was thus anchored; the inshore pontoon had a cable fastened to each end and fastened to stakes on shore, one about thirty paces up and one thirty paces down stream from the bridge.

The bridge was built in accordance with the methods set forth in the Pontoon Manual; the pontoon part by the method of "successive pontoons." The following is taken from the Pontoon Manual:

The pontooniers are formed and divided into sections for constructing the bridge, which is executed in the following manner:

A trench about one foot in width and depth is excavated to receive the abutment sill; this should be laid horizontally, and exactly perpendicular to the axis of the bridge; it is secured by four pickets, two driven in front and two in rear, about eight inches from each end.

A pontoon is brought up opposite to the abutment, and close to the shore.

The two cable men each drive a picket in the river bank, one thirty paces above, and the other the same distance below, the bridge; to these they make fast the shore lines, the free ends of which they carry with them into the pontoon.

The front rank of lashers step into the pontoon, provide themselves with two lashings each, and station themselves opposite the lashing hooks facing toward the shore.

The balk-carriers bring up five balks; one end of each is delivered to a lasher, who places it with its down-stream edge over its lashing hook, and its cleat against the outer edge of the exterior gunwale. He then takes one turn with a lashing around the balk and hook.



MAJOR GENERAL JOHN C. BATES AND STAFF CROSSING PONTOON BRIDGE.
Camp Root, Fort Riley, Kansas.

The pontoon is pushed off by the balk-carriers until they can engage the cleats of the shore ends on the abutment sill. The down-stream edge of the balk must be over the score in the sill.

The cable men, under the direction of the officer in charge, adjust the position of the pontoon by means of the shore lines, which are then made fast to the mooring posts.

As soon as the first set of balks is laid, a chess is placed on edge in the trench above mentioned, and in contact with the ends of the balks. Its upper edge should be one and one half inches above the balks. Earth is rammed behind it, crowding it firmly against the balks.

Two men, one standing on the first and second, and the other on the fourth and fifth balks, receive the chess from the chess-carriers, and lay them with their scores exactly in the axis of the bridge. Each chess must be pushed firmly against that which precedes it. The covering is carried to within one foot of the pontoon.

The pontoon which has cast the first up-stream anchor, having dropped down to the head of the bridge, is entered by the cable men—the man in the bow taking the cable of the up-stream anchor which he finds in it, the other receiving the cable of a down-stream anchor from one of the anchor detachment. The rear rank of the section of lashers also enters this pontoon.

Five balks are brought up as before; the ends are delivered to the lashers in the second pontoon, which is pushed off; the shore ends of the balks are delivered to the lashers in the first pontoon, who place them on the down-stream side and in contact with those of the first set, their cleats against the outside of the interior gunwale. They lash the balks firmly together and to the lashing hooks at both gunwales, and then step into the third pontoon.

When a bay is completely covered with chess, the side rails are laid. They are placed directly over the outside balks, to which they are lashed at three points—at the middle, and immediately over the axis of each pontoon, at which point the two side rails and balks of two bays lap and are all lashed together.

To Dismantle the Bridge.—The material is supposed to be transferred to the shore opposite to that from which the bridge was constructed.

The side rails are removed from the first bay, and the lashings and rack-sticks thrown into the nearest pontoon. This operation is continued, the removal of the rails preceding that of the chess by one bay.

The chess are removed from the first bay by two men standing on the uncovered balks, who hand them to the carriers to pile on the shore.

When the first pontoon is uncovered, the balk lashings are removed and put into the locker. The balk-carriers drag the balks onto the bridge, shoulder, and carry them off. The cable men detach the shore lines and coil them in the pontoon. The abutment sill is also placed in this pontoon.

When the second bay is uncovered and its balks unlashed, the latter are seized by the balk-carriers and dragged on the bridge. This operation draws the first pontoon alongside of the second, into which the cable men step; the first pontoon is then rowed across the river to the anchor section.

The up-stream cable man moves from each pontoon as it is dismantled into the next, unmooring and turning over those which are anchored to the up-stream anchor section, who weigh the anchor and row to the shore.

The down-stream anchors are weighed as soon as the pontoons to which they are attached are dismantled.

Trestle Bridge Over a Watercourse.—The abutment sill is laid in the usual manner, and a raft is constructed of two pontoons, connected by two balks lashed to the outer lashing hooks. The raft is partially decked by laying chess between and parallel to the balks, thus covering the first pontoon and part of the second.

On this raft the members of the trestles are embarked, the caps and legs on the balks and over the second pontoon, the chains on the deck, and the false legs and shoes in the bow and stern of the first pontoon. The raft is brought opposite to the abutment, and is, at the commencement of the operation, held in position by the cable men with their shore lines; afterward, by cables from up- and down-stream anchors.

A trestle is assembled with its cap resting on the ends of the balks which overhang the first pontoon of the raft, its legs horizontal and pointing toward the abutment. The trestle being righted and the five abutment balks engaged on its cap, the raft is pushed off and the balks are engaged on the abutment sill. The position of the trestle is accurately adjusted by the cable men, and the legs are thrust down and driven with a maul into the bed of the stream. To allow for the tendency of the latter to spread apart when driven into the ground, they should, when first touching bottom, make a less angle with the vertical than fifteen degrees. As soon as the legs are settled into place, the chains are toggled and the raft disengaged. The remaining trestles are similarly placed, and the roadway is finished as usual.

Three regiments of infantry, one battalion of infantry, two squadrons of cavalry, and two field batteries crossed the bridge in forty-five minutes. It must be noted, however, that the organizations, except the artillery, were about one half of war strength.

The two field batteries crossed the bridge in ten minutes; the riders dismounted and led the horses.

A cavalryman crossed in one and three quarters minutes.

The cavalry dismounted in crossing. .

During the crossing of the bridge by the troops, two men sat in each pontoon, one at each end. They inserted such ches as were broken by the stamping of the horses' hoofs, tightened up the lashing, and in general looked after the bridge.

After the troops had crossed, two pontoon bays were removed, in order to show the manner of dismantling and assembling the bridge. The command to dismantle being given at 4:40 P. M., the first boat was freed at 4:53 P. M., and rowed ashore. The second boat was freed at 4:57 P. M., and was pulled to its up-stream anchor and held there. All the material for the two bays had been removed on shore. There was now nearly a forty-foot opening in the bridge. At 4:58 P. M. the command to assemble the bridge was given, and at 5:27 P. M. the two bays were finished and the bridge was intact again.

The bridge was thrown across the river in twelve hours, but I was informed by Captain Clement A. F. Flagler, Corps of Engineers, commanding Company "C," who built the bridge, that it could have been done in considerably less time if he had had a larger force; also, that the same force could build it quicker, having this experience.

The bridge was dismantled and material piled on shore in two hours.

Double Lock Spar Bridge.

A double lock spar bridge, 45 feet long (having three 15-foot bays), was thrown across a ravine in three hours by thirty men, the material having been previously cut and assembled. The material used was cut in the vicinity. This bridge was built of trees, from 6 to 12 inches in diameter, cut in lengths from 12 to 20 feet, and trimmed free from branches, and lashed with ropes. The trestle consisted of two long tree trunks, or legs, lashed with a cross-piece at the bottom

("ledger") on the side next to the ravine, and a cross-piece ("bridge transom") at about the height of the floor, which was placed on the side next to the bank. Two braces, 5 inches in diameter, were placed diagonally across the legs, between the transom and the ledger. The trestles were assembled on the ground, and when placed in the bridge leaned toward the center of the ravine, so that they were 15 feet apart at the floor line and about 25 feet apart where they were placed on the ground in the holes dug for the legs. Two logs ("straining beams"), about 20 feet long and 12 inches in diameter, were thrown across the top pieces ("bridge transom") of both trestles inside the legs, and fastened against the legs. Across these straining beams and against the trestle legs on the sides farthest from the abutments, two logs ("floor transoms") about 12 feet long were placed. Upon these floor transoms and parallel to the axis of the bridge were placed seven balks to each bay, which were logs about 20 feet long and 8 inches diameter. On top of these balks, laid crosswise and close together, were placed the chess or flooring, consisting of logs about 12 feet long and 4 inches diameter. This finished the bridge. Soil and grass were then thrown upon the flooring.

A set of maps was made, under the direction of Second Lieutenant Nathaniel E. Bower, Corps of Engineers, Company "A," First Battalion of Engineers, of the route taken by the battalion from Fort Leavenworth to Fort Riley, a distance of one hundred and thirty-eight miles. The maps showed surveys of over three hundred and fifty miles of roads, to a scale of three inches to one mile. These maps are made on cavalry sketch pads, by mounted men, detailed for that purpose. On each pad is a scale which divides a mile into time periods to correspond with the time taken by a horse to walk that distance. A compass is set in the pad frame to determine direction, and a clinometer to determine grades. At the end of the day's march, the sketches made are placed in their proper order and orientated upon a stiff piece of paper upon which they are pasted. The rough office map showed a regular patchwork where the different pieces had been placed together on the large sheet. A tracing was then made, producing the finished map. These maps showed all natural and artificial objects by conventional signs; the rate and direction of the grade of the roads were indicated by percentages and arrows, which were marked on the side of the road.

A lecture was given by Captain James B. Cavanaugh, Corps of Engineers, commanding Company "D," First Battalion of Engineers, explanatory of the model intrenchments which had been built by a detail from one of the companies of the battalion.

The trenches built were the skirmish, kneeling, and standing, developed into shrapnel and shell trenches. The revetments used were

the gabion, hurdle, and sand-bag. A sand-bag loop-hole was likewise shown.

Fascines were made and bound with wire. This naturally explained the fascine rack and chocker. The construction of the gabion and hurdles was also explained. High-wire and low-wire entanglements were built.

A white line marked at two-pace intervals was laid upon the ground to trace a proposed intrenchment. A detail of men with picks and shovels was then distributed, one man to each interval. This was explanatory of the manner in which a half company of engineers could intrench an entire company in twenty minutes.

Being detained I heard only a small part of this lecture, and hence lost the opportunity of taking a great many valuable notes.

On the march from Fort Leavenworth to Fort Riley, shelter tents were pitched for the men, and wall tents for the officers, and in some cases a conical wall tent for each company, to hold stores, etc.

From the sound of reveille the train was ready to move in one hour and forty minutes.

Revolvers are part of equipment, but are not issued to dismounted men in time of peace.

The mounted men were all armed with the new .30-caliber carbine, lately issued.

The engineers built the trenches and pits occupied by the infantry and artillery during the maneuvers.

I wish to express my thanks to Major Smith S. Leach, Corps of Engineers, commanding First Battalion of Engineers, and to the following officers of his command: Captain Clement A. F. Flagler, commanding Company "C"; Captain James B. Cavanaugh, commanding Company "D"; First Lieutenant Harry Burgess, adjutant, and Second Lieutenant Nathaniel E. Bower, topographical officer, for maps, data, etc., and many courtesies extended.

FIELD ARTILLERY.

I visited the camp of the artillery and found that the Kansas batteries had left for home, their time allowed for the maneuvers having expired, the Twenty-eighth Battery, U. S. A., being the only one in camp. The Sixth, Seventh, Nineteenth, and Twentieth were in their quarters at the Post, and no time was available to visit them.

The Twenty-eighth Battery, Field Artillery, is one of three batteries in the U. S. Army which carries the Vickers-Maxim quick-firing mountain gun of seventy-five mm. (about three inches) caliber.

The organization consisted of one captain, one first lieutenant, two second lieutenants, three staff sergeants, six duty sergeants, twelve corporals (six of whom acted as gunners and six as ammunition cor-



MODEL INTRENCHMENTS.
Built by Company D, 1st Battalion of Engineers, Camp Root, Fort Riley, Kansas.

porals), four artificers, two musicians, one civilian packer, and two cooks; having altogether ninety-five men for duty, besides fifty-six mules, sixteen horses, and four six-mule wagons.

The train was divided into three platoons of two sections each. One section consisted of one chief of section, who was a sergeant gunner, one ammunition corporal, seven cannoneers for service of piece, and five drivers, four mules to each piece, and four mules for ammunition.

The six guns carried were of a type specially designed with reference to mountain warfare.

The gun when limbered weighs about 815 pounds, has wheels 3 feet in diameter and 32 inches width of track. It has a range up to 4,000 yards, which takes about seventeen seconds for time of flight of projectile.

Five kinds of fixed ammunition were carried: common, double common, cannister, shrapnel, and ring shells. Common, shrapnel, and ring shells weigh $12\frac{1}{2}$ pounds each, cannister 15 pounds, and double common shell 18 pounds.

The gun and its equipment for purposes of transportation were divided into four parts and loaded upon mules having specially designed pack saddles. The pack saddles weigh 51 pounds each, and the loads average about 250 pounds each, making total weight carried by one mule about 300 pounds. Four mules carried the ammunition on similar pack saddles. Each mule was loaded with twelve shells, carried in ammunition-carriers, holding three rounds each, and the weight, including pack saddle, varied from 285 to 317 pounds, dependent upon the class of ammunition carried.

The gun was unpacked and put in action in eight minutes. It took a little longer time to pack it.

A pair of light shafts are carried, so as to enable the mule to pull the gun (when limbered) over the ground.

During the maneuvers the range was determined by the aid of Weldon range-finders.

SIGNAL CORPS.

The detachment of the Signal Corps present at Camp Root consisted of five officers and seventy-six men; Captain Edward B. Ives acting as general signal officer, Captain Daniel J. Carr in command, and three first lieutenants, one of whom was acting property officer and adjutant. All the officers and about one half the men were mounted.

The apparatus used by the Signal Corps during the maneuvers was as follows: The visual apparatus comprised flags as described in Myer's Manual, four Colt's acetylene lamps for night signals, bombs and rockets. The electrical apparatus consisted of the signal corps service telephone and switchboard, the field telegraph train as described in Myer's Manual, the ordinary commercial Morse apparatus, field glasses of various types,

portable searchlight, automobile, and three bicycles. The flags were the ordinary ones employed in the wigwag system.

The Colt's acetylene flash lantern was employed for night signals. The flash is produced by means of a key which causes a full flame to burst forth in the lantern for the length of time the key is pressed down; when the pressure is removed the light reduces to a minute jet, not visible to the receiving station. It is carried in three leather cases, one holding the tripod, one the generator, and the third the flash lantern, reading lamp, and remaining parts. It is assembled on an extension tripod, with the flash lantern on top, the generator attached to the legs beneath the lantern, and the reading lamp is placed on one leg near the lantern. The signals can be seen up to thirty miles with an ordinary field glass.

Each signal station was supplied with one telescope mounted on a tripod, and two field glasses. The field glasses used had a small compass on top.

The smoke-ball rocket had an explosive sound at its maximum height of about 350 feet, and emitted a dense volume of smoke. This bomb necessarily meant one conventional signal, and was fired from a mortar. It was used to indicate the noon hour and also the finish of the day's problem during the field maneuvers.

The sequence rockets are small discs attached to a pilot rocket. Four hundred and twenty-eight conventional signals are represented by no more than two rockets, red and white in color. Red represents "2" and white "1" in the alphabet of the Myer's code. Four places are used.

The corps installed a telegraph line from the railroad station at Fort Riley post to a central office at Headquarters. The wire was strung upon poles made out of 2-inch pipe about 20 feet long, with iron cross-arms which held the insulators. This line used the commercial Morse system of telegraphy. The central office at Headquarters contained the switchboard, and was connected with the headquarters of each organization by telephone.

The telephone wires were stretched upon lances made of wood 2 inches in diameter and about 20 feet long, which had insulators screwed on top. Thirty poles to the mile were used. An ordinary line is strung at the rate of two miles per hour, but can be played out up to four miles per hour. In crossing roads two lances are strapped together with iron bands tightened with bolts.

The telephone employed was the portable field telephone, and No. 14 galvanized wire was used.

An instrument carried in a small leather pouch designed to be slung over the shoulder, called a cavalry buzzer, is so arranged that telegraph and telephone messages can be sent with it. The wire is laid upon the ground, and the current is supplied from a battery of four small cells.

The wire is very light copper, is put up in half-mile lengths on small hand reels about four inches in diameter, and is laid by a man on horseback, who carries three reels in his saddle pouches while he strings the fourth. One man can thus lay two miles of wire. This instrument was employed in the Philippines, and worked through twenty miles of wire laid over rice paddies. The copper wire is usually abandoned after laying.

The field train had lance wagons (capacity, two hundred lances each)—one lance wagon was fitted to serve as a telephone and telegraph office—coils of wire, insulators, picks, shovels especially suited for digging post-holes, etc.

Small pocket repair kits containing nippers, knife, and screwdriver were carried by some of the men.

The detachment had its own kitchen and cooks.

A searchlight of 60,000 candlepower, with plant, was carried upon three caisson trucks, distributed as follows: The light and controller upon one truck, the engine, dynamo, and cable upon a second, and the boiler upon a third. The boiler was an 18-horsepower portable type, rigged upon a caisson truck, which was unlimbered, leaving the pintle resting on blocking when plant is in use.

A second caisson carried one 13-horsepower engine and one direct-current dynamo; 1,200 feet of insulated cable was reeled on the forward truck. The engine was connected with the dynamo, and the cable carried the current from the dynamo to an electrical device called a controller, from which the searchlight was operated. Steam was supplied from the boiler to the engine by means of pipes.

The searchlight was moved by two small dynamos placed beneath it, which responded to the controller, with which they are connected by 100 feet of cable. The light is operated from the controller, which must be some distance from the light to enable the operator to see what he is doing, otherwise the light blinds him. The controller is connected to the dynamo by means of the 1,200 feet of cable carried on its caisson.

This plant was used to supply the electric light for Headquarters and the mess hall. When used for a lighting plant the dynamo had a capacity of one hundred and eighty lights of 16-candlepower each.

The automobile employed was a Peerless gasoline of 26-horsepower, and had been in use two months. It cost \$2,700, and it was claimed that after making about five thousand miles it would require a general overhauling. It made an average speed of thirty-two miles per hour over country roads, and can go forty-two miles per hour. It used about ten gallons of gasoline in running eighty-five miles, and used more fuel on slow speed than on high speed per mile. This machine was used by Generals Greely and MacArthur at the Army and Navy maneuvers during September, 1902, in New London, Conn.

The detachment established the telegraph and telephone lines upon the maneuver field for each day's problem, as well as transmitting messages by the aid of flags.

I wish to express my thanks to Captain Edward B. Ives, Captain Daniel J. Carr, First Lieutenant Richard O. Rickard, and First Lieutenant Alfred T. Clifton, Signal Corps, for many courtesies extended.

INFANTRY CAMP.

The infantry was placed on both sides of a long street 280 feet wide. In this street, and 100 feet from each side, the sinks were placed in two lines, thus leaving a central street between the sinks 80 feet wide. This long street was at the foot of each organization's camp. The company streets were 60 feet wide; officers' streets were 80 feet wide; regimental streets were 80 feet wide. There was no extra space allowed to separate the battalions, each street having the same width for the entire regiment. Captain Chauncey B. Baker, Chief Quartermaster, informed me that if possible it is desirable to double these distances. All kitchens were at the head of the company and next to the officers' streets. The sinks were at the foot of the company street and 100 feet distant from the nearest tent. This arrangement separated kitchens and sinks as far as possible.

The water supply was ample and good and was drawn from the Post waterworks. Water was piped to all commands, the hydrant being at the head of the company street. Wall tents were used for officers, and Sibly wall tents for men. As a rule, the furnishings of an officer's tent consisted of one cot, one folding chair and table, one roll of bedding, and one small, flat trunk. The band was placed on a company street on the right flank of the regiment.

The regimental hospitals were generally placed on the flank and at some distance to the rear of the regimental headquarters. The most suitable place was chosen. Sibly stoves were used for heating tents, which were placed in the center of the Sibly tents, and at the front or the back of the wall tents, in which case the stoves were tilted a little to let the pipe through the tents, as no elbows were furnished. Some coal-oil stoves were used by officers, but the smoke and smell were very annoying.

The Sibly tents, pitched with 10-foot intervals, held ten cavalrymen each, and twelve infantrymen, the men sleeping with their feet to the center of the tent. Straw was used by them to lay their bedding on. All tents were properly trenched. The sinks were likewise protected. One sink, which had been filled with water, was abandoned, and a new one dug near it.

The food of the camp was the regular garrison ration. I noted that the kitchens and vicinity were clean, slops thrown into the barrels and

covers put over them. The utensils that were hung up were all clean and no dirty dish-rags were lying around. The cooks looked clean. Some of the boxes in the kitchens had the appearance of being too large and cumbersome. Smaller and easier handled ones would have been desirable.

The First and Second Kansas National Guard Regiments had the following officers detailed for duty with them: Captain Benjamin Alvord, Twentieth Infantry, as adjutant general; Captain Harry C. Hale, Twentieth Infantry, as inspector general; Major Henry P. Birmingham, Surgeon Medical Department, as brigade surgeon. Whilst their camp was in first-class condition, I noted that especial pains had been taken by the men, as follows: Trenches were dug to drain each company street, and all the tents were ditched and drained into the main company ditches, which carried all water outside of the camp. These trenches were evenly dug to a line.

While in some camps, owing to the men washing at the hydrants, the vicinity thereof was muddy, the Kansans had placed barrels in line with each company's tent row, in the center of the street next to the sinks, from which the men dipped out their water in basins and washed, scattering the soiled water in the street.

As these organizations left camp before the close of the maneuvers, I examined their camp site after they had left the ground, and found that every regulation had been complied with—no stakes sticking in ground or lying loose, rubbish all burnt and fires out, sinks filled in, trenches filled up, etc.

CAVALRY CAMP.

The cavalry was encamped with the picket line in the center of the troop street, which was 90 feet wide, and the horse equipment covered with pouches was placed on the ground on a line between the tents and the picket line. Some troops had racks, over which the equipment was thrown. Their general arrangement of camp was similar to that of the infantry. Water-troughs, some of wood and some of sheet iron, were placed at the head of the troop streets. During the wet and rainy weather the horses were moved from the troop streets and picketed on higher ground, as the mud into which the manure was tramped became very deep and troublesome.

Brigadier General J. A. Wiley, Pennsylvania National Guard, informed me that he carried flies and kept the animals of his command under them during his service in the late Spanish war. This protected the animals and the ground upon which they stood. The animals of adjoining commands, which were out in the cold and rain without shelter, did not begin to compare with his in appearance, health, and vigor. It was claimed that this method of treatment hardened the

stock, but the number of sick horses in Troop K, Eighth Cavalry, which I especially noted after the wet and cold nights, would at least justify a trial of General Wiley's method. The loss in stock would fully reimburse the extra expenditure for shelter, and the extra weight of baggage could more easily be carried in the wagon by animals in good condition than those same animals in poor condition could transport the baggage without the extra.

SANITATION.

Sinks and Sink Frames.—The sinks were trenches dug 6 feet deep, 2 feet wide, 6 feet long for officers; 12 feet long for men.

The sink frame placed over the sink was built of wood and had the following dimensions: For the officers 6 feet long, for the men 12 feet, 2½ feet wide, and 22 inches high. The top of this frame was divided by pieces 5 inches wide into divisions, triangular in shape, having a width of 14 inches at the front and nothing at the rear, so that there were seats on both sides, affording five seats for officers and ten seats for the men. The frame had the bottom cross-pieces 4 feet wide, so as to span the trench. A 6-foot frame had two cross-pieces, one at each end, and a 12-foot frame had three, one being placed across the center in addition to the end ones.

All sinks in the case of the officers were covered with a wall tent; in the case of the men most of them were inclosed by boughs, and in some cases covered with them; a few were covered by tents. In one case an oil can was placed beneath the frame so as to serve as a urinal. One objection to the form of the seats was that they were soiled by the men urinating. This could have been avoided by leaving one end of the frame next to the entrance of the sink inclosure open at the top (*i. e.*, no seat slats). Urinal cans in the shape of old five-gallon coal-oil cans were placed one to each Sibly tent at dusk, where they remained until reveille, for the use of the men during the night, as experience has shown that the men will not go to the sink for that purpose after dark. In the morning these cans were emptied into the sink, were kept at the sink during the day, and were treated with lime.

The inspection of these sinks was made daily, and the companies were not dismissed from morning parade until either a field officer or the regimental adjutant had inspected the same and found them satisfactory.

Policing.—All sinks were policed as follows: Twice a day, one hour after breakfast and one hour after supper, straw was placed about three inches thick in the sink, over which was sprinkled about one quart of crude petroleum per sink, and then the sink was burned out. A little quicklime was used after each burning, after which a little earth was thrown in.

Through the courtesy of Lieutenant Colonel S. C. Mills, Inspector General, Maneuver Division, I accompanied him on a tour of inspection of the sinks of the entire camp. I did not notice any smell whatever, and moreover very few flies were seen. Whether the cold weather had something to do with the flies I could not say. However, I noted quite a few flies around the kitchens.

It may be instructive to note that the inspector first called at the headquarters of the officer whose command he was about to inspect as a matter of courtesy, as well as to enable the inspector to inform him or his representative what he required done and for explanations, etc.

Garbage.—The garbage was removed twice daily: after breakfast, and after supper; and the general instruction was to the effect that only dry garbage was to be removed, which was done as nearly as possible. It was taken about one mile from camp and buried in trenches, which were dug to a depth of 6 feet. The garbage was collected from two hundred circular cans about 18 inches diameter and about 36 inches high, made out of galvanized iron and having a cover.

All garbage cans were placed back of the kitchen, and on the line of the officers' street, to facilitate inspection. The wagons made the rounds of the camp, and the cans above noted were emptied into barrels carried on the wagons. The total garbage handled amounted to 3,840 barrels of fifty gallons capacity each. The force necessary to handle this quantity varied, from one foreman, one team, and two laborers, to one foreman, eight teams, and fourteen laborers. The Chief Quartermaster had charge of this work, which was done by a local contractor.

NATIONAL GUARD OFFICERS.

The following National Guard officers, representing twenty-two States and Territories, registered at the bureau of information. Some of these officers had served in the war of '61, nearly all had served in the late Spanish war, and some are graduates of West Point, who, having resigned from the regular service, still keep up their interest in military tactics:

Name.	Rank.	Organization.	Address.
Armour, Dryce D.	Major	Brigade, R. I. Militia	Providence, R. I.
Archer, Harry L.	Colonel	Nebraska N. G.	Beatrice, Neb.
Bowman, S. A.	Lieut. Colonel	3d Infy., Indiana N. G.	Waterloo, Ind.
Brown, George H.	Adj. General	Michigan N. G.	Port Huron, Mich.
Burlingame, E. P.	Brig. General	Oklahoma N. G.	Guthrie, O. T.
Brooks, W. R.	Captain	Nebraska N. G.	Fremont, Neb.
Billings, Samuel	Colonel	Oklahoma N. G.	Guthrie, O. T.
Byrd, P. G.	Colonel	Georgia N. G.	Atlanta, Ga.
Barry, P. H.	General	A. G., Nebraska N. G.	Lincoln, Neb.
		Home address, Greeley Center, Neb.	
Cole, George M.		A. G., Connecticut N. G.	Hartford, Conn.
Coleman, William J.	Major	Indiana N. G.	New Albany, Ind.
Coulter, Thomas B.	Major	Indiana N. G.	Vincennes, Ind.

Name.	Rank.	Organization.	Address.
Drew, Jr., O. C.	Major	A. A. G., Texas Vol. Gd.	Houston, Texas.
Darling, Charles H.	Colonel	6th Infy., Mass. V. M.	Boston, Mass.
Dally, B. H.	Major	1st Infy., Wisconsin N. G.	Milwaukee, Wis.
Dockweiler, J. H.	Major	Eng. Officer 1st Brig., Cal. N. G.	Los Angeles, Cal.
Donovin, G. B.	Colonel	Ohio N. G.	Columbus, Ohio.
Douglass, E. G.	Captain	Oklahoma N. G.	Guthrie, O. T.
Falls, DeWitt Clinton.	Captain	Adj. 7th Reg., N. Y. N. G.	New York City.
Fee, James F.	Lieut. Colonel	1st Infy., Indiana N. G.	Greencastle, Ind.
Gilmore, C. O. M.	General	New Jersey N. G.	Trenton, N. J.
Gilkyson, F. G.	Major	New Jersey N. G.	Trenton, N. J.
Hutchings, Henry.	Colonel	1st Texas Infy.	Austin, Texas.
Huguenin, E. D.	Colonel	2d Infy., Georgia N. G.	Macon, Ga.
Harrison, Joseph R.	Major	3d Infy., Indiana N. G.	Columbia City, Ind.
Holland, W. L.	Captain	"A" Troop, Nebraska N. G.	South Omaha, Neb.
Jayne, E. H.	Major	Oklahoma N. G.	Guthrie, O. T.
Landstreet, John.	Captain, C. S.	Virginia N. G.	Richmond, Va.
Louden, T. J.	Major	1st Infy., Indiana N. G.	Bloomington, Ind.
Miller, E. S.	Brig. General	A. G., North Dakota N. G.	Bismarck, N. D.
Mead, H. E.	Colonel	Ohio N. G.	Dayton, Ohio.
MacDonald, Clay C.	Major	4th Infy., Missouri N. G.	St. Joseph, Mo.
McCoy, George W.	Colonel	1st Infy., Indiana N. G.	Vincennes, Ind.
McGurrin, William T.	Colonel	2d Infy., Michigan N. G.	Grand Rapids, Mich.
Racer, F. H.	Captain	Oklahoma N. G.	Guthrie, O. T.
Stacy, William H.	Major General	Commanding Div. T. V. G.	Austin, Texas.
Saunders, John S.	General	A. G., Maryland N. G.	Annapolis, Md.
Stevenson, F. E.	Major	Artillery, Indiana N. G.	Rockville, Ind.
Tanner, Herbert S.	Brig. General	Brigade, R. I. Militia	Providence, R. I.
Thomason, Robert U.	Colonel	3d Infy., Georgia N. G.	Madison, Ga.
Tilgman, B. C.	Major	Pennsylvania N. G.	Philadelphia, Pa.
Whiteman, W. H.	Brig. General	A. G., New Mexico N. G.	Santa Fé, N. M.
Wiley, John A.	Brig. General	Pennsylvania N. G.	Franklin, Pa.
Whitney, J. H.	Brig. General	Massachusetts V. M.	Boston, Mass.
Webster, Irving E.	Colonel	2d Infy., Florida N. G.	Gainsville, Fla.
Young, Edward C.	Colonel	1st Cavalry, Illinois N. G.	Chicago, Ill.
Yoder	Captain	Nebraska N. G.	Wymore, Neb.

This list does not include the officers from Colorado and Kansas who were in camp with their organizations; counting these, there were twenty-four States and Territories represented.

The following resolutions were adopted and signed by the visiting National Guard officers:

CAMP ROOT, FORT RILEY, KANS.,
October 7, 1902.

WHEREAS, We, the undersigned officers of the National Guard of the various States and Territories of the Union, detailed by the Governors of the respective States and Territories (twenty-one of which are here represented), in compliance with the request of the Honorable Secretary of War, to witness the maneuvers of the Regular Army and National Guard forces, assembled in camp of instruction at Camp Root, Fort Riley, Kans., having observed the different military problems daily; therefore, be it

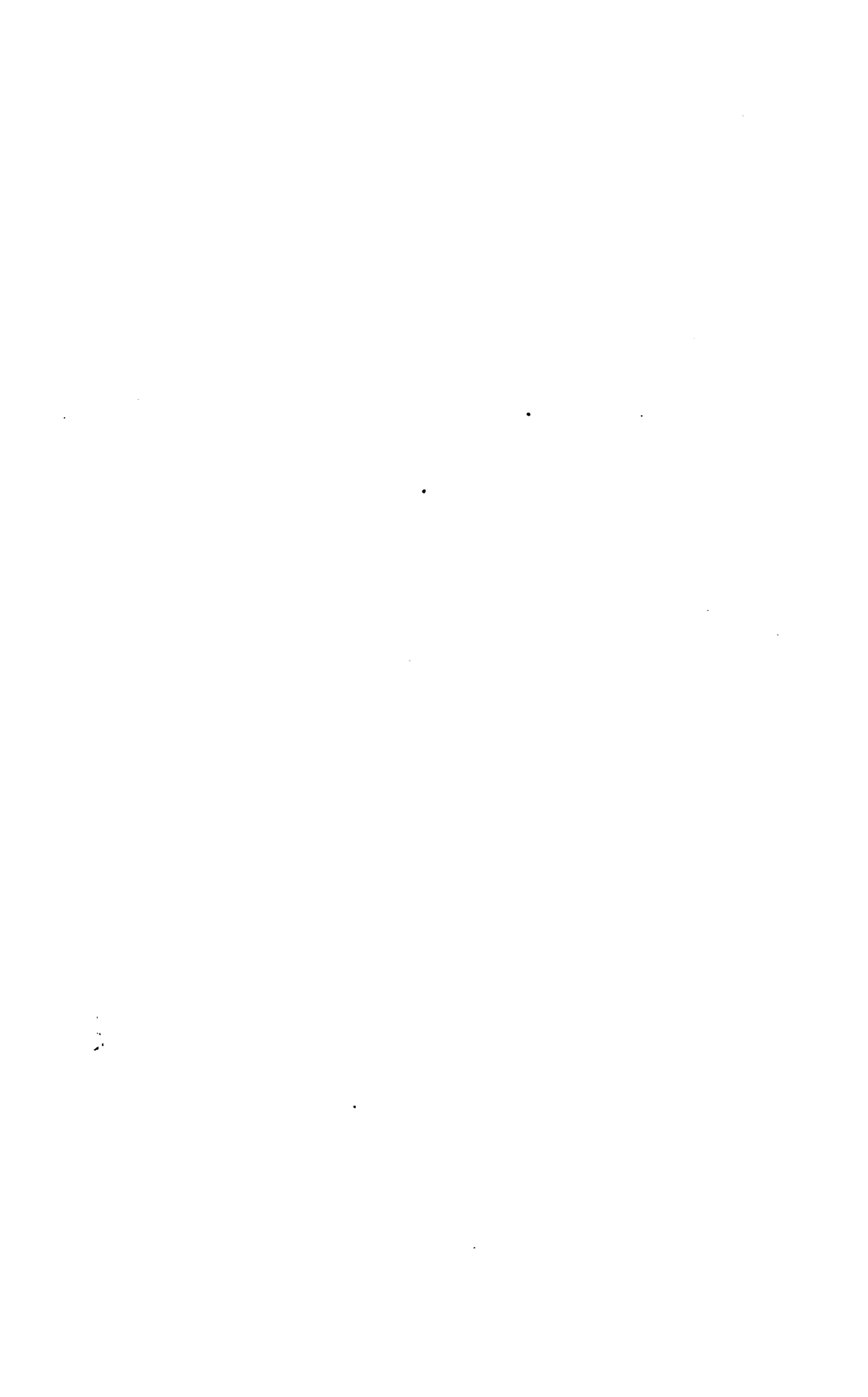
Resolved, First—That we desire to thank the Honorable Secretary of War for permitting us to witness the maneuvers from which we have derived so much benefit.

Second—That we desire to express our thanks to Major General John C. Bates, U. S. Army, commander of the maneuver division, and his staff, for their unflinching courtesies to us at all times, thus enabling us to perform our tours of duty most satisfactorily.

Third—That we desire to thank Colonel Arthur L. Wagner, Assistant Adjutant General, U. S. Army, chief umpire, for the instruction he has given us, and for his able



NATIONAL GUARD OFFICERS.
Present at Lecture on Intrenchments, Camp Root, Fort Riley, Kansas.



discussion of the various problems, and for his most practical and brilliant lecture on military strategy.

Fourth—We desire further to commend the policy of the National Government, as indicated by this camp of instruction, and for its effort to bring in closer contact the Regular Army and National Guard forces; and we trust that these joint maneuvers may be continued annually.

Fifth—That these resolutions be engrossed, one copy to be forwarded to the Honorable Secretary of War, one to Major General John C. Bates, U. S. Army, and one to Colonel Arthur L. Wagner, Assistant Adjutant General, U. S. Army.

To First Lieutenant Van Leer Wills, Twelfth Infantry, A. D. C., in whose charge the visiting National Guard officers were committed, I wish to express my thanks for numerous courtesies extended.

MISCELLANEOUS OBSERVATIONS.

That infantry intrenched can not be dislodged by less than tenfold numbers.

That trenches should not have loose stones in the embankments, as a shell will scatter the stones, thus adding to its destructive force.

That all officers should be skilled in hasty intrenchments.

That all officers should carry the best field glasses, with a strap attached to the glass, so that it can not be dropped easily.

That the sword is of no practical value to an officer, and when worn the scabbard should be of dark, non-reflecting metal.

That all officers transmitting orders on the field should, if possible, write them and carry pad and pencil for the purpose.

That at least eighteen mounted orderlies should be assigned to each regiment.

(This question was generally debated in one of the meetings, but where to get them from was not determined upon.)

That extended order should be the formation after the scouts are driven in.

That Cossack posts are considered the most practicable.

That marksmanship in the individual soldier is more necessary than ever.

In the matter of music at "retreat" it may be of interest to note that the Star-Spangled Banner was played as follows: eight bars and repeat and sixteen bars to the finish.

The sink is the first work undertaken when a command reaches camp, and is properly ditched so as to prevent its filling with water.

RECOMMENDATIONS.

As a result of my observations, in order to gain all the practical knowledge and experience possible at future maneuvers, I would respectfully recommend:

That a National Guard officer from each arm of the service be detailed to a similar arm of the Regular Army, participating in the maneuvers;

if possible to stay with it from the beginning to the end of the encampment, so as to familiarize himself with its work in field and camp.

Likewise one officer should be detailed to each staff department (if permission can be secured), to go through the routine work, and thoroughly master the "paper work." Each of these officers to make a report in writing upon his return to the senior officer of the detail, who will consolidate said reports and forward them with any report he may see fit to make to the Adjutant General.

These officers should act in the capacity of instructors to disseminate the knowledge and experience thus gained, through their respective organizations, by such means as may be most practicable upon their return.

I wish to take this opportunity of expressing my appreciation for the many courtesies extended to me by Major General John C. Bates and staff during my tour of duty at Camp Root, Fort Riley, Kansas.

I have the honor to remain,

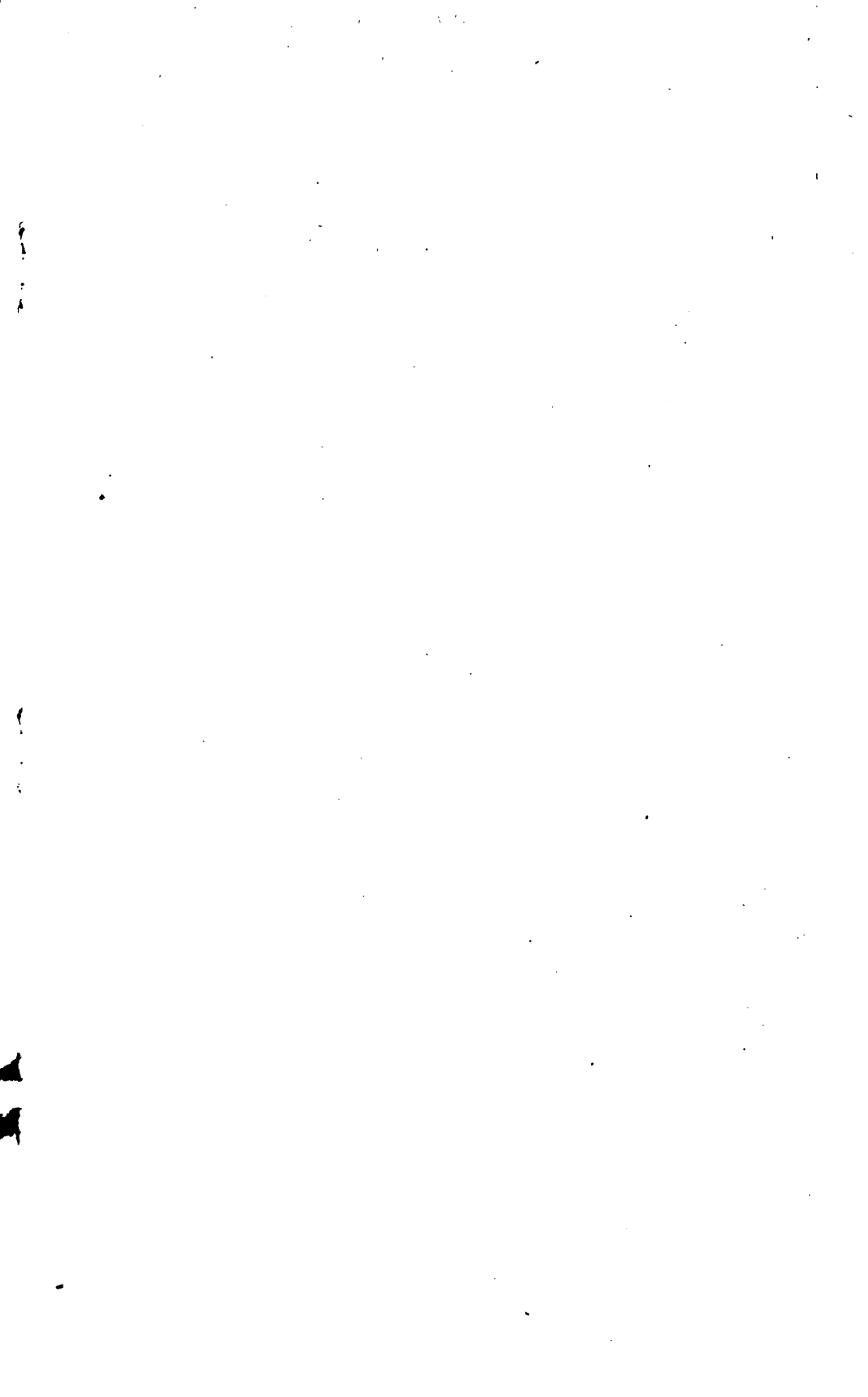
Very respectfully,

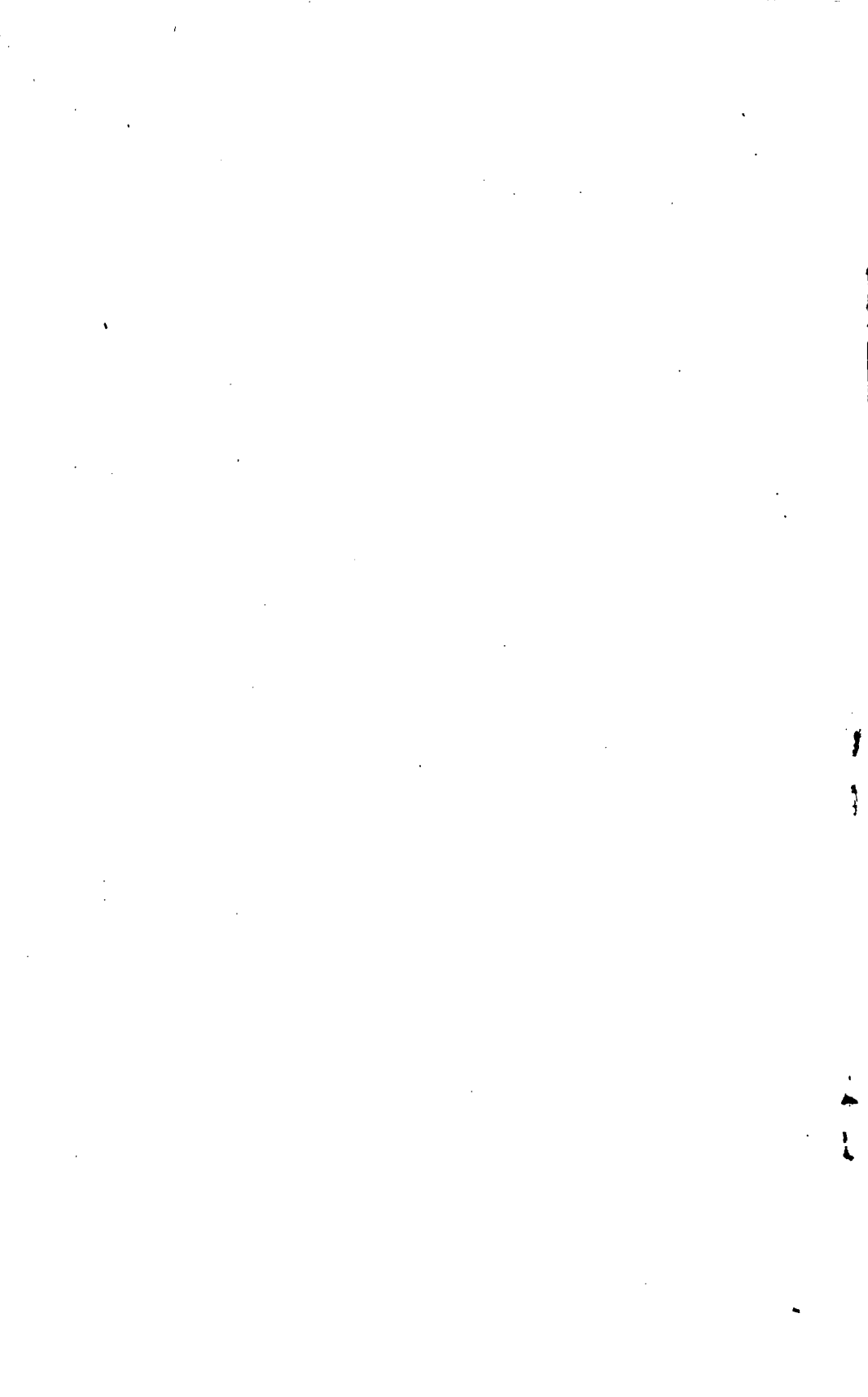
37 exhibits.*

J. H. DOCKWEILER,

Major and Engineer Officer First Brigade, N. G. C.

* NOTE.—Owing to insufficient funds, it was impossible to publish all the various exhibits and photographs submitted with the report.









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